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September 1988

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AMSTRAD Computer User



The official magazine for all users of the Amstrad CPC series

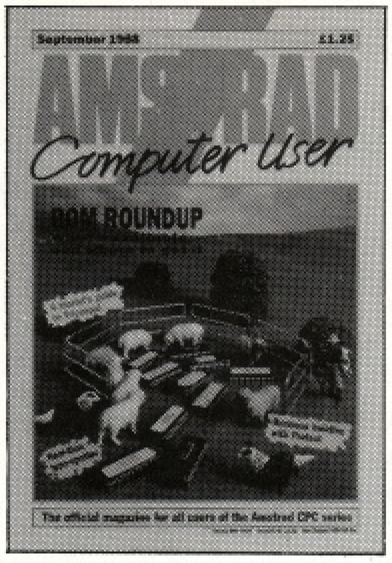
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AMSTRAD Computer User

The official magazine for Amstrad CPC users

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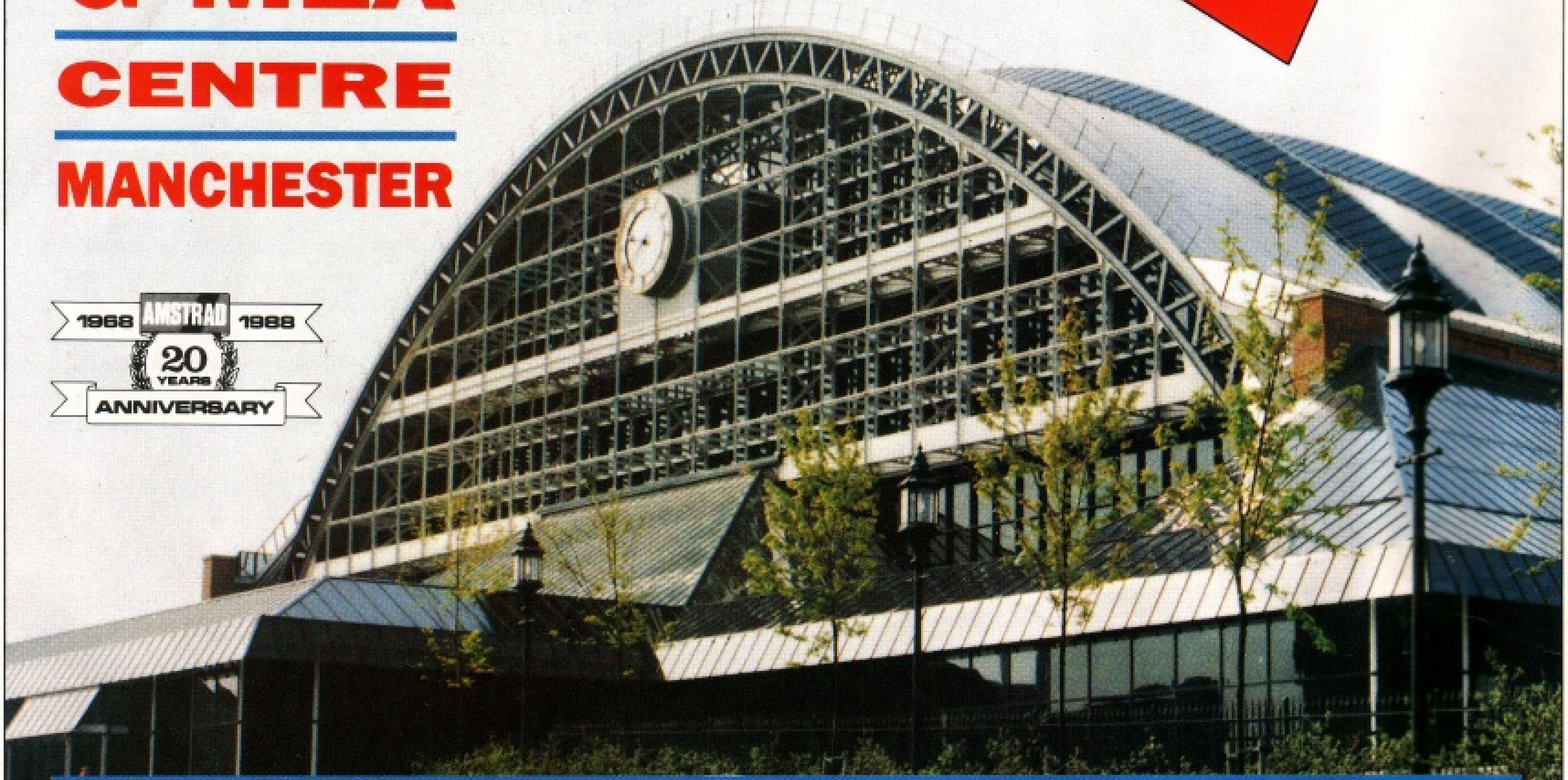
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R141

The biggest and best computer show of them all returns to Manchester – to the impressive surroundings of the G-MEX Centre.

Whether you use an Amstrad at home or at work, you'll find all you need at the show.

Amstrad and over 70 other exhibitors will be showing off their latest products and giving you the opportunity to try them out for yourself. Leading experts will be on hand throughout the show to answer all your technical queries.

With the hundreds of special show offers your visit will repay itself many times over – especially if you use the advanced ticket order to register early and save yourself £1!

How to get there

Situated in the heart of the city centre, G-MEX is only one mile from the M602, and there's ample car parking space beneath the hall. G-MEX is also within easy reach of Victoria and Piccadilly railway stations, as well as Chorlton Street bus station.

35/1713

Levy benefits Amstrad

ALAN Sugar's announced intention to be the world's number one printer manufacturer has received a boost from an unexpected quarter. The European Commission has imposed a tariff on printers made by Japanese manufacturers. Both Epson and Citizen have slammed the 33.4 per cent levy.

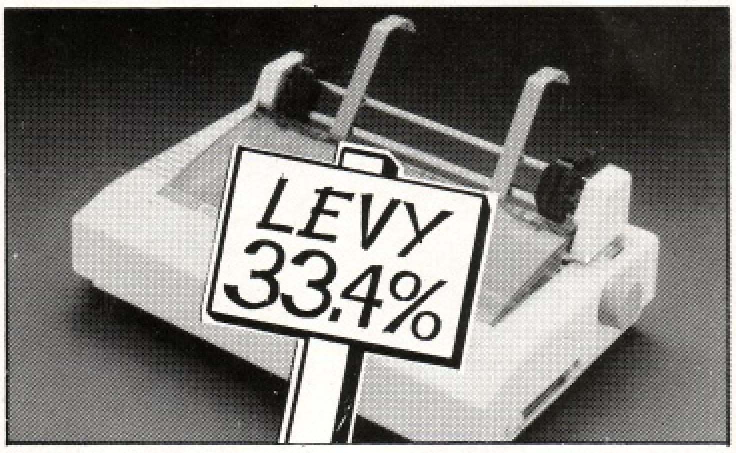
Robin Marriott, European market manager for Citizen Europe, told *Amstrad Computer User:* "We are very disappointed with the European Commission's decision to impose duty on our products and quite honestly, I can't see the levies benefiting anybody".

Amstrad is an exception. The successful range of DMP and LQ printers are made in its own factories in Hong Kong. Amstrad also uses a Timex factory in Scotland, but the tariff rules do not apply in either case.

Jenny Lynn-Jones, Epson printer business manager told us of her company's price rises. "Under this new pricing structure, our customers will still have the same choice but will find that the retail prices (ex-VAT) differ – in some cases by as little as £4 – with an average increase of around 10 per cent", she said.

Citizen Europe has not yet passed this levy on to its customers, but Robin Marriott has confessed that ultimately prices will rise.

So with the DMP 2160 already representing good value for money for CPC owners it looks as though it could soon be the only sensible choice.



The popular Citizen 120-D – for a 10 per cent price rise?


Johny Dumfries, 5th earl of Code


Abigail Darling, 3rd child of Jim

That's a wrap!

CODE Masters calls itself the essential family business.

The company is owned by David Darling (21) and Richard Darling (20). Abigail Darling (19) has worked on the administration side of the company since its creation and art student Lizzie Darling (17) is the company's official photographer. William Darling (8) has a key role as games tester, aided by the twins John and Anne Marie (4).

Jim Darling, another Code Masters employee and the father of this motley crew, must be as proud of them as they all are of Johnny Dumfries, the British racing car driver sponsored by their company.

After 24 hours of flat out racing, the Jaguar XJR9LM of Johnny Dumfries won the 1988 Le Mans. With co-drivers Jan Lammers and Andy Wallace they successfully fought off the challenge of the powerful works Porsche team. This historic victory is the first for Britain and the Jaguar team at Le Mans since 1957.

Johnny is now working with Code Masters on a sports car racing game provisionally titled Johnny Dumfries' World Championship which will be available this autumn.

CP/M+ rom revolution

GRADUATE software has done it again. Less than five months after the release of Rom CP/M+ v1 comes Rom CP/M+ v2, with some really exciting enhancements.

To start with, the CCP command that had to be issued in v1 before running most CP/M+ files is no longer needed, meaning Graduate's extra commands are always present.

But the best news of all is that Rom CP/M+ v2 can load and run CP/M command files from rom. Yes, any existing .COM files can be blown on to rom and the programs executed as normal by typing their names at the CP/M prompt – just imagine, gation map.

Full support will be given, including a disc-to-rom command file transfer service. Rom CP/M+ v2 costs £24.95 (original CP/M+ master disc needed). Existing users will be able to upgrade to v2 for a nominal fee.

Graduate is also developing a graphics adventure creator on rom. No further details are available at present. Graduate can be contacted on 0272 656659.

Canadian combat

WITH the launch of Night Raider, Gremlin Graphics has taken a positive and permanent step away from its famous cute and cuddly image.

This latest arcade simulation and strategy game was conceived and designed by Michael Bate, the man behind the design of Ace of Aces and Dam Busters.

Night Raider is a flight and combat game that simulates the World War II mission to sink the Bismarck. The player is placed in the pilot's seat of an actual torpedo bomber and must fly into the night to seek out the enemy.

The game will feature takeoffs and landings, real time controls, combat sequences with a variety of enemy targets plus a navigation map.

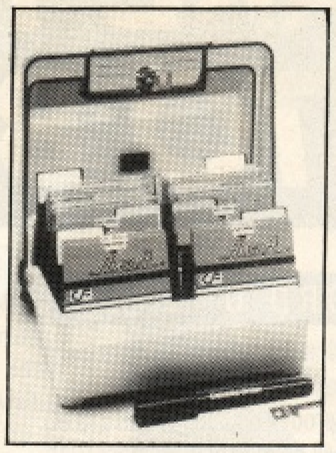
Pick us a winner

PRO-PUNTER from Lancashire based DGA Software is a sophisticated, menu-driven expert system for home micros that claims to accurately interpret horse racing form.

Researched and developed over three years, Pro-Punter uses information from the racing press and analyses all major aspects of racing form. It produces a race forecast, generates a computer SP, highlights good and poor value bets and offers investment advice.

Since its launch in May 1987, predictions monitored by the racing press have resulted in a profit in excess of 90 level-stake points over 100 races, and a strike rate of over 50 per cent.

We at *ACU* have always been sceptical about such programs, but now that Pro-Punter has been converted for the CPC we will be able to test DGA's claims to the full. However, if you can't wait for the review, Pro-Punter is out now and costs £57.50 (6128 disc only). Further details from DGA Software on 061 330 0184.



Undercover operation

AS a new addition to the extensive range of Amstrad add-ons, SBS Computer Supplies has announced a new selection of storage boxes for 3in discs.

The new attractive storage boxes, made of sturdy plastic with a clear lid, have been specially designed for CF2 discs. Two versions are available – one that will hold 25 uncased discs (15 cased) at £9.52, and a larger model, with a 50/30 capacity, that has a lock for added security costing £15.83.

Further information from SBS Computer Supplies Ltd on 0273 726331.

GALLUP SOFTWARE CHART

TM	LM	Title	Company	Price	Market MS
1	1	Steve Davis Snooker	Blue Ribbon	£1.99	100
2	2	Super Stuntman	Code Masters	£1.99	83
3	4	Fruit Machine Simulator	Code Masters	£1.99	68
4	NE	Yogi Bear	Alternative	£1.99	65
5	NE	Ace	Cascade	£2.99	64
6	19	Shanghai Karate	Players	£1.99	59
7	14	We are the Champions	Ocean	£9.99	54
8	9	Ninja Scooter Simulator	Firebird Silver	£1.99	51
9	8	Way of the Exploding Fist	Mastertronic	£1.99	50
10	3	Ghostbusters	Mastertronic	£1.99	48
11	RE	Soccer Boss	Alternative	£1.99	47
12	16	Out Run	Sega US Gold	£9.99	46
13	RE	Six Pak 3	Hit Pak	£9.99	45
14	RE	Aliens	Mastertronic	£1.99	44
15	5	Trap Door	Alternative	£1.99	43
16	7	Popeye	Alternative	£1.99	42
17	15	Grand Prix Simulator	Code Masters	£1.99	40
18	10	BMX Simulator	Code Masters	£1.99	38
19	13	Skate Rock	Mastertronic	£1.99	37
20	RE	Super Robin Hood	Code Masters	£1.99	36

TM: This month. LM: Last month. MS: Market strength

ROUND THE SHOWS



Bundle of goodies

ALL selling was halted on the Official Amstrad Magazines stand at the recent Amstrad Show while Richard Sekula of RAM Electronics presented the winner of the March *ACU*, competition, Mr T.Coombes of Bristol, with his £750 bundle of CPC add-on goodies.

Mr Coombes, who had never previously visited the Amstrad Show, spent a great afternoon at Alexandra Palace.

His entry was drawn from a sack containing more than 3,000 correct entries.

For the record, the correct answers were C, A and A in

Meet the world

EXHIBITORS at the Personal Computer Show 1988 will be entertaining the world in more ways than one at Earl's Court, London, from 14-18 September. Last year the event attracted more than 50,000 visitors specifically interested in home and leisure products, most of them in games.

This year's audience will find an even more impressive line-up. Among top names in the leisure software industry are Centresoft, Elite, Grandslam, Gremlin Graphics, Mandarin, Mastertronic, Mirrorsoft, Ocean, Palace, Telecomsoft and US Gold.

A spokesperson for Telecomsoft said: "We are coming back to the Personal Computer Show because it is the one time of the year when we can show our products to the kids and speak to foreign distributors and journalists, all under one roof."

More first-time exhibitors than ever will be coming from the Continent including UBi Soft, FIL and Infogrames from France, Linel from Switzerland and Microdigital Soft from Spain.

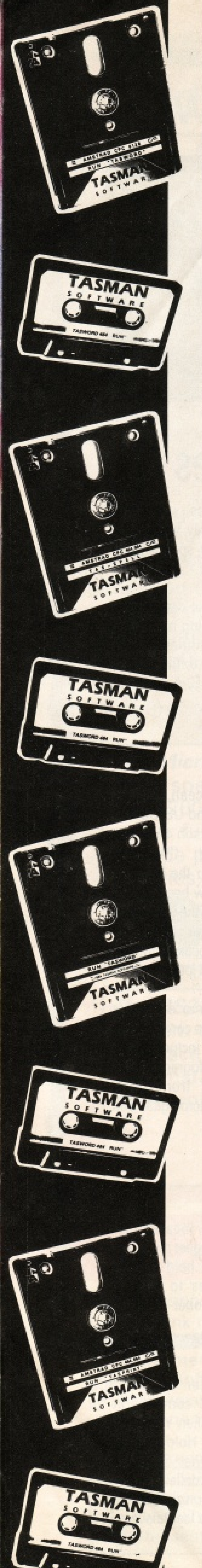
Diary date

THE great northern Amstrad showcase returns to Manchester in October.

Once again the award-winning G-Mex exhibition centre is the location for what is the biggest computer specific show held outside London. Dates to note in your diary October 21 to 23.

Aussie winner

THE winner of the *ACU* impromptu competition for our Australian readers only was Scott Holder of Salisbury Downs, South Australia, who collects copies of Every Second Counts and Beyond the Ice Palace.



SOFTWARE THAT'S HARD TO BEAT

TASWORD 6128

The Word Processor — with Mail Merge

The established, powerful word processor for the Amstrad CPC 6128. TASWORD 6128 has been specifically developed to use 64K of memory as text space. This means a text file can be a massive 60,000 characters in length, enough room for over 10,000 words!

Featuring all standard and many extra word processing facilities TASWORD 6128 incorporates sophisticated print options, on-screen help, notepads, user definable keys allowing commonly used words, sentences or paragraphs to be typed with a single keypress and a powerful built-in data merge facility.

Extensive customisation facilities allow many of the facilities to be changed for personal requirements and saved into the program.

By combining power with ease of use TASWORD 6128 is the complete word processor for the CPC 6128. **Disc £24.95**

TASWORD 464-D

The Word Processor — with Mail Merge

The TASWORD especially developed to utilise the capabilities of the CPC 464 and 664 disc drives. Additional facilities include a larger text file size and automatic on-screen disc directories during save and load operations.

A major feature is the data merge facility. Mail merge, in which a letter is printed any number of times, each individually addressed to a different person, is just one application of this powerful facility. TASWORD 464-D is supplied on, and only runs on, disc.

Disc £24.95

TASWORD 464

The Word Processor

Your 464 becomes a professional standard word processor with TASWORD 464. Supplied complete with a comprehensive manual and a cassette which contains both the program and TASWORD 464 TUTOR. This teaches you word processing using TASWORD 464. Whether you have serious applications or simply want to learn about word processing, TASWORD 464 and the TUTOR make it easy and enjoyable.

Cassette £19.95

TASWORD UPGRADES

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TASCOPY 464

The Screen Copier for the CPC 6128, 664 and 464

A suite of fast machine code screen copy software for the CPC computers. Print high resolution screen copies in black and white and also large "shaded" copies with different dot densities for the various screen colours. TASCOPY can also print "poster size" copies — screen copies printed onto two or four sheets can be cut and joined to make the poster. **Disc £12.90 Cassette £9.90**

TAS-SIGN

The Sign Maker for the CPC 6128 and PCW

Produce and print your own signs, posters, banners and large notices to get your message across with maximum impact.

A complete sign making package including four distinctive lettering styles, character heights from one inch to the full width of the paper, italics, underlining, borders, eight shading patterns, variable letter spacing, automatic kerning and line centering.

Signs may be printed across the paper or along the length of the paper to produce large eye-catching banners and notices.

Disc £29.95

NEW!

TAS-SIGN — additional fonts

Two new, impressive fonts for TAS-SIGN, the sign maker: ROMAN a clear, classical font and HOBART, a bold and imposing typeface.

Disc £12.50

TAS-SPELL

The Spelling Checker

Spelling mistakes and typing errors spoil any document whether it's a private letter or your latest novel. With TAS-SPELL you are free to be creative in the confident knowledge that your spelling won't let you down.

TAS-SPELL checks the spelling of text typed with TASWORD 464-D and TASWORD 6128 by comparing the words in your text with those in a dictionary of over 20,000 words. Suspect words are highlighted — you may correct, ignore (it might be a name) or even add words to the dictionary. Please note that TAS-SPELL only works with TASWORD 464-D and TASWORD 6128. **Disc £16.50**

TASPRINT 464

The Style Writer for the CPC 6128, 664 and 464

A must for dot matrix printer owners!

Print Tasword output and program listings in a choice of five impressive print styles. Varying from the futuristic DATA RUN to the hand writing style of PALACE SCRIPT, TASPRINT gives your output originality and style! **Disc £12.90 Cassette £9.90**

TAS-DIARY

The Electronic Diary TAS-DIARY for the Amstrad CPC 6128, 664 and 464 with disc drive

Keep an electronic day-to-day diary on disc! TAS-DIARY features a clock, calendar and a separate screen display for every day of the year. Each year stored on disc includes a memo pad and several note pages.

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Sorry

IF I were the Editor of *ACU* I would stop printing survey forms on the reverse of one of the better articles in the magazine the readers may wish to retain.

I must say the magazine has shown a distinct improvement in the last year – keep up the good work.

David Brown,
Winsford, Cheshire.

LD: *Ahem. Our apologies to the millions of you who picked us up on this point. Yes, we should have known better. No, it won't happen again.*

Inky dinky don't

THE original ribbon I received with my DMP2000 was still producing photocopyable text after 300 pages of A4 text, and is still capable of printing readable copies after two years. The first replacement ribbon I bought was of the same quality. These two ribbons appeared to be made of cotton, and the ink is definitely black.

I have subsequently bought 12 Amsoft 06049 nylon ribbons and none has lasted for more than a few pages before the print turned grey. After 50 pages I have received complaints from my clients that they could not produce readable photocopies from my text.

The poor quality of the Amsoft 06049 is not only annoying, but it also gives a bad reputation for Amstrad products since people will be inclined to think that it is their DMP printers which are incapable of producing a sustained output of clear printing. I would have thought, therefore, that it is in the best interests of Amstrad to improve the quality of Amsoft 06049, thus giving clients up to six times the value for their money.

If Amstrad is unable to supply them, can anyone tell me where I can get ribbons of the original quality?

R.A. Hannan BSc, MICE.
Montpellier, France

LD: *Erm. Yes. I really don't know if or when DMP2000 ribbons changed from cotton to nylon. I rather suspect they were never cotton to start with. Are you sure you are storing them in a cool place? Apart from that, all I can suggest is that you change your supplier.*

By the way, are you a one-button mouse or a two-button mouse?

Three of a kind

WHAT is the difference between a Riteman FT, DMP2000 and DMP3000 apart from their colour? Does the DMP3000 print better than the DMP2000?

R. Thornley,
Tamworth.

LD: *Mechanically, all three of the printers you mention are exactly the same. The DMP3000, however, is aimed at the PC owners' market and comes with a PC printer lead, PC Basic examples in the manual, and an IBM type character set instead of an Epson type one.*



Wrist terminal

IN the September 1985 *ACU* I noticed a review of the Seiko RC-1000 wrist terminal. I was wondering whether you could give me some more information about it.

Could you also tell me the cheapest dot matrix printer you have come across?

Craig Campbell,
Fife, Scotland.

LD: *The RC-1000 costs £49.95 including lead and software and is available from Screens, Main Avenue, Moor Park, Middlesex (Tel 09274 20527).*

The cheapest dot matrix printer I know of is being sold at £99.95 by Morgan Computer Company, 64-72 New Oxford Street, London WC1 (Tel. 01 255 2115).

What the doctor ordered

THE autowind of my Olympus camera has a remote control jack socket. When the terminals are switched together, the camera shutter is released and the film advanced one frame. The remote control jack on the the standard CPC 664 cassette lead fits the camera's autowind. Using the routine |TAPE:SAVE"!":|DISC, photographs can be taken at programmed time intervals.

Unfortunately, the SAVE"!" takes about 20 seconds to complete and it is therefore not possible to take photographs more frequently.

Is there a routine by which the cassette motor switch can be opened and closed more quickly?

Dr Paul Thornton,
Huddersfield.

LD: *There certainly is. CALL &BC6E will switch the cassette motor on, and CALL &BC71 will switch it off.*

```
10 MODE 1
20 frames=20:GOSUB 1000
30 END
999
1000 FOR loop=1 to frames
1010 PRINT"Frame";loop
1020 CALL &BC6E:CALL &BC71
1030 NEXT:RETURN
```

The motor relay takes a short while to get its act together, so the above routine will take one photo about every three seconds. Too quick? Well, I'm sure I can leave the rest to you.

Informal Pascal

I AM writing this note in response to R.H. Williams' letter in the June issue with regard to a Pascal Users Club.

While it's not exactly a formal club, I am in contact with several other Pascal programmers and we would be delighted to hear from him or others in similar straights.

Anyone who contacts me will receive any help that we can give as regards the black art of Pascal Programming.

Gordon Yacomine,
4 Murray Street,
Dundee, Scotland.

Wobbly Arnold II

I HAVE the same problem with the datacorder as Mr I.K.Gee (Letters, July 1988). The solution is to turn it upside down and prop the computer with books on either side, making sure that they don't touch the keys on the datacorder.

I've a feeling it's the alignment of the heads. Is there any way of aligning heads cheaply?

Fergus Leen,
Penarth, Sth Glams.

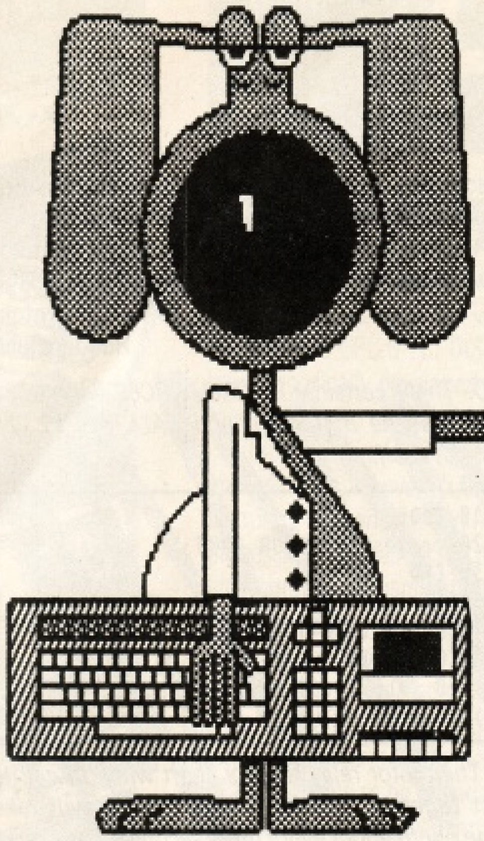
LD: *Any computer software stockist will sell you an azimuth head alignment kit for around seven or eight pounds. The job's not difficult unless you are hard of thinking.*

Don't know about you, but I think I'd soon get tired of having to up-end my 464 every time I wanted to load something. There's got to be a better way. Hasn't there?

Amster's gaol

I HAVE just bought a modem and interface and now access the Cymrutel database almost every

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Lance Davis
Letters Editor
Amstrad Computer User
169 Kings Road, Brentwood
Essex CM14 4EF



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Est. 1986 – Phone 01-898 1090

night. Could you tell me which software would best cater for my needs as I need to write a lot of message off-line? The software I have now – RS232 + Commstar – does not allow me to do this, so editing and leaving messages is proving to be a costly matter.

Also, even though any machine with the right software can access Cymrutel, I was disappointed to find that there is no CPC software to be downloaded. Using software I have bought, I would be able to list some of the many Amsoft games, and others, and I would like to know if you can give me permission to leave some of these listings on the database for other Amstrad users to look at, change or download.

Gareth Roberts,
Colwyn Bay.

LD: Eeeek! Don't do it, Gareth. Neither Amsoft nor any other software house has any connection with ACU, and putting commercial software on a public bulletin board could get you and the Cymrutel sysop an unpleasant holiday at Her Majesty's pleasure.

The software you need to prepare messages off-line and then upload them is the Cage comms rom. If you don't own a rom board, this little black widget can replace the HoneyView rom inside your RS232 interface. It can do all the videotex things you want it to do and more. If you don't believe me, phone Ian Hoare on 01 965 8957 and ask him. He's the man to speak to about buying one, too.

Too many Ks

WHEN I save a screen – with SAVE"screen",B,&C000,&4000 – the length of the SCREEN.BIN file should be 16384 bytes, which is 16k. But the file is 17k. What is wrong?

Rolf Nordeide,
Norway.

LD: Nothing is wrong. Your SCREEN.BIN file comes up as 17k on the disc because the file's header on disc is an extra 128 bytes on top of the 16384 screen bytes, thus tipping the scales to the next kilobyte in a disc CAT.

Trade secrets wanted

I FOUND the Rimwriter article in the July *ACU* a very interesting insight into a programmer's problems. It reminded me of my struggles to learn machine code and the many nights I have sat up late with cups of coffee.

May we have a series of articles on advanced machine code games programming? I am sure there must be many people like myself who have had their CPCs for two or three years, learned Basic and moved on to machine code.

You can learn how to program using the firmware from books and short magazine series fairly easily, but, as I'm sure anyone who has tried writing a game will know, many of the firmware routines are too slow for games. I see many adverts for programmers wanted and finished games wanted. Surely a series to reveal some of the tricks of the trade can only be of great benefit and interest to many readers.

John Wright,
Solihull.

LD: Peter Green, the author of Rimrunner on the CPC, also wrote an excellent series on machine code for ACU called Assembly Point.

In that series he got as advanced as one can get with machine code without going into dozens of pages of solid source code. He showed you how to write Breakout, and Stix type games. The latter had source code running over two months (Jan & Feb 1988) and featured some fairly advanced machine code programming techniques.

The firmware is slow on occasions – particularly when writing to the screen – due to Locomotive's error trapping routines. An experienced machine code programmer would know how to grab the code from rom, remove the error trapping and patch the jumpblock to use the altered routine, thus speeding things up considerably.

The best way to learn how the professionals do it is to hack into their code and study it. I wish you the best of luck.

Union blues

I INTEND using my 464 in conjunction with my union work. I need a program that will allow me to store up to 300 names and addresses, and is also able to list and delete when changing circumstances arise. Could you please tell me what sort of tape I will require?

R Bailey,
Doncaster.

LD: What you need is a database, and the only tape-based database I can think of is the one in Mini Office II. It has all the facilities you require so hunt out the double-page advert for it in any recent ACU. It's very blue. The colour of the advert, that is.

Missing manual

I HAVE recently acquired a 6128. Where can I get a manual and information about the two CP/M discs?

D Scribble,
Liverpool.

LD: I seem to get at least one letter like this every month now, although usually I can read the signature.

You can get the manual from CPC Ltd (Tel 0772 555034), and a wonderful book called The Amstrad CP/M Plus from MML Systems Ltd, 11 Sun Street, London, EC2M 2PS.

Joysticks

DOES the Cheetah Mach 1+ joystick require a splitter? I don't want to spend more than £15, what other ones do you recommend?

Simon Kent,
Wincanton.

LD: I've tried the Cheetah Mach 1+ and I can't get it to work. I've got it working on other machines, but it just doesn't seem to respond as a second joystick on the CPC.

I would recommend the Konix Speedking and the RAM Delta as good sub £15 joysticks.

AJ accolade

AT last, a series on Amstrad machine code. I was in despair waiting for one to begin. I had almost written strongly to all the magazines proclaiming to support Amstrad users on the subject, when you start a series and halt me in my tracks.

But it doesn't stop there because you allow what must be one of your best writers to create not only the best introduction to serious Amstrad machine code and firmware calls, but you let him (her?) loose with a real sense of humour as well. I am singing praises to, of course, the noteworthy Auntie John, who shows that programming can be amazingly exciting – or jolly good fun, at the very least.

I have seldom come across an article in any computer magazine that claims to get you writing machine code using jumpblock entries, firmware calls and the like, without pointing out that before you can actually use any information contained in the article, you have to attain the level of Grand Master of the Inscrutable Memory Map first.

There must be a large number of users who, like myself, just don't have the time to wade through, digest and spend hours at the keyboard – or simply find the subject incomprehensible – but have progressed from Basic and are wanting to delve into the depths of their Straddy without having to reach Grand Master status first.

Auntie John gets the point across in such a non-complex, easy-to-understand way that almost anyone can not only start writing machine code from the word Go, but understand just what it is they are doing.

I do hope this series will be a long running, regular feature, and that it will not fizzle out after only a few months. This must be a very popular subject, and the tips on How To become Popular are proving a resounding success, too.

T. Colmaine,
Chatham, Kent.

LD: Thank you, Auntie John's Mum. Don't worry, your son will have plenty of board & lodgings money to hand over because the series has a long way to go yet.

Chip off the old block

CAN I use an FD-1 disc drive as a first drive on my 464? Is it true that the only difference between an FD-1 and a DDI-1 is the connecting leads?

Is it possible to to buy an FD-1, and buy the interface and cable for the DDI-1 separately? And if I do buy the FD-1, is it possible to buy CP/M+ on rom without the master disc?

Andrew Given,
Edinburgh.

LD: The FD-1 cannot be used as a first drive on your 464 because it doesn't include the interface

or the disc operating system, neither of which can be bought separately. And even if you could buy the interface and software separately, you'd end up paying more than the retail price of the DDI-1.

Graduate will not supply you with CP/M+ on rom unless you have a bona-fide CP/M+ serial numbered master disc.

Corruption

I AM not a software pirate, but I do wish to take copies of my discs in case of corruption. To this end I bought Multiface Two and have been very pleased with it.

Now I find that new software will not load if it detects the presence of an imager. How on earth can an imager be used for piracy, as it has to be present before the resultant copy can be loaded?

Well as far as I am concerned the software companies have done it; I will not buy any more games as I do not intend to waste the money that I have spent on my imager.

Chris Whiting, Croydon.

LD: *Hard-cased, shuttered CF2 discs are corrupted very rarely. In fact, with proper care and attention they should never get corrupted at all. I am still using discs that were produced before the CPC arrived on the market.*

OK, accidents happen, but why should the software house be punished for the actions of careless disc users? Having said that, almost all software houses will exchange a corrupted disc for a new one for a nominal fee.

Control yourself

I HAVE developed a smallish stock control program and would like your opinion of it. It incorporates AMX commands for the windows and the desk background. Please could you write and let me know your opinion?

I am becoming interested in machine code now, but I don't know how to get started. Please could you give me some advice about what I need to buy?

John Gimber, Swansea.

LD: *One of the pleasures of my job is appraising the programs readers send in for possible publication. Every now and then someone sends in a very good full-blooded integrated disc based game or utility that, for one reason or another, would be impossible to present as a type-in.*

Your stock controller, John, falls into this category. Apart from the fact that not everyone owns a disc drive, I think Advanced Memory Systems would have something to say if we published their AMX Windows code. Don't you?

If you're the type of person who likes writing utility programs, particularly ones involving floating point numbers, I would advise against learning machine code. You would be better off to learn Forth, Pascal or the C programming language. But to answer your question. First you will need an Amsdos Z80 assembler – Maxam from Arnor is the most popular (Tel 0733 239011).

Next, if you're serious, you need The Firmware Guide (Soft 968) which the User Club should have (Tel 091 510 8787).

Thirdly you'll need a book to learn from. Machine Code for Absolute Beginners by Joe Pritchard is excellent. It's published by Melbourne House – any good book shop could get it for you, if they haven't already got it.

Last, and very possibly least, all the best-dressed machine code novices are reading Auntie John's Machine Code these days. In fact, you should never leave home without it.



Cheap modem wanted

COULD you please recommend a modem for the 464 in the price range £30 to £50? Also, would you have any information on a cheap subscription to a facility like MicroLink?

Paul Campbell, Bangor, N.Ireland.

LD: *The best value offer on the market at present is the MicroLink dual-speed modem for £99. It comes with a free registration to MicroLink worth £15 plus one free month's connect time – which must be worth up to a fiver I suppose – bringing the actual price of the modem down to around £79. Of course, you'll need an RS232 interface as well – they cost about £50 to £60 including software, which makes a total of about £135.*

Sorry, Paul. I'm afraid that where comms is concerned, £50 isn't a lot of money. You can contact MicroLink Communications on 0625 878888.

Crazy Creeper

WHEN I hit 350 points in Creeper, my program goes bonkers. The tail end to the creeper is no longer erased and I get an *Improper argument in 590*. Please help.

N.P. Fairclough, Chelmsford

LD: *There were no misprints in the Creeper listing, so I guess it's back to the old drawing board.*

The Improper argument would have something to do with the value of variable SX or SY going above 25 or 40, or below 0. Check all lines in the program that assign a value to either of these variables.

Grandstand finish

Grandstand Computers Ltd, Amstrad's agent over here, went down the tubes – basically because their service, assistance and interest were the pits. They have been replaced by Brandt. I cannot tell you where they live as their publicity machine is mute.

Luke Bickett, New Zealand.

LD: *Thanks, Luke. We've done a bit of dig*

around and have come up with Brandt's details. Their address is Brandt Corp Ltd, 25 Sheffield Crescent, Box 14081, Christchurch, New Zealand. Tel (from UK) 010 64 358 5159.

Big Screen blunder

BIG Screen (*ACU* January 1988) is causing me to go insane. Line 1240 is obviously wrong as it is one character shorter than all the others.

I realise that you may have printed the correction, but unfortunately I have been unable to obtain a copy of your magazine since February due to my friendly neighbourhood stockist stopping stocking.

Can you please send me a scrap of paper with the solution on it?

Kane Guy,
Gillingham.

LD: *We did indeed publish an "oops" for Big Screen the following month (February 1988) at the foot of page 5. To save you looking it up, here are the corrections:*

```
1240 DATA f5,83,cd,95,83,00,00,00,c5,
     1093
2430 DATA b8,d0,3a,c7,c7,a6,07,38,
     0c,111e
```

Cold solder

I HAVE a problem. When the refrigerator turns itself off it often turns my 464 off as well, causing loss of all my data. Is there anything I can do about this?

A Scrawl,
Pitsea, Essex

LD: *Sigh. Another illegible signature. What you are suffering from, Mr or Mrs or Miss or Ms Scrawl, is affectionately called a "spike", otherwise known as a surge in the power supply – in this case caused by your fridge shutting its motor off.*

What you need is an anti-surge arrestor plug. Try Screens on 09274 20527.

Big improvement

I WOULD like to show my support to the views of Colin Harris of Nemesis. There has been a big improvement in the contents of *ACU* since the beginning of this year.

I think the reason for this is that you are keeping in touch with your readers. Some editors get a bit too arrogant for my liking!

Ken Campbell
Portsmouth.

LD: *The Editor has pinned your letter to his heart.*

Sometimes...

MY 464 sometimes won't load some of my games. Some work, and some don't. Sometimes it will read error. My husband decided to buy a tape alignment kit to see if it would make any difference, but it hasn't. Could it be the tape door, as it is slightly up one side? Should I take the computer back to the shop?

A Doidge,
Cullompton, Devon.

LD: *It could be a number of things. The tape door should close flush, so, yes, it could be that. But whatever it is, I suggest you return it to your local Amstrad dealer for a checkup.*

No game keys

I HAVE typed Killerball into my 6128, following the program you specify exactly. However, when I try to run the game I can only get as far as line 1810. When I press the spacebar I get the game on the screen, but the keys do not respond and the game wipes off the screen.

Mike Younger,
Hove, E.Sussex.

LD: *You've got me baffled, Mike. The Killerball listing contained no misprints, and I know the game works because I have it running on an adjacent 6128 here in the office at this very moment.*

This can mean only one thing – you have not typed the listing in correctly. Your typing error is almost certainly somewhere in the DATA statements from line 2000 onwards. It's machine code, so the teensy-weensiest mistake will cause big problems.

Calling all RSXs

I AM in the design stage of a random access database for the CPC. The program needs to be written totally in machine code, so that it will fit into ram while remaining fast.

Therefore, I would like to make use of the Rodos commands by calling them from machine code.

I have tried doing this by first initialising Rodos and then logging on its RSXs, but when a call is made all I get is "To many parameters". By the way, shouldn't that be "Too"?

Could you please inform me of how a Rodos command can be called and used from machine code, especially formatting?

J Brooker,
St.Leonards-on-sea,
East Sussex.

LD: *The technique for executing routines in external roms from machine code is very simple. You load HL with the address of the command name to search for, and then make a call to &BCD4 – that's KL FIND COMMAND. This leaves the address of the external routine in HL and the rom select number in C. An immediate jump to a low memory vector at &1B will then execute the routine.*

However, some external commands may need parameters to be held in certain registers. The Rodos FORMAT command, for example, can have up to four. And don't forget that A should hold the number of parameters, even if there are none.

The vector at &1B passes all registers except IY to the routine it is calling, so unless you have the correct parameter values held in the correct registers before the jump to &1B, strange things may happen.

Here is the necessary code to execute the Rodos FORMAT command. Without parameters this will format the disc to Rodos's own special 200K format if you respond accordingly to the safety prompt, which still pops up.

```
ld hl,rsx       ;address off command.
call &bcd4      ;kl find command.
                ;address of routine
                ;is returned in HL.
                ;rom select number
                ;is returned in C.
ld a,0          ;no parameters.
jp &1b          ;call the command.

.rsx            ;the command name.
defm "FORMA"
defb "T"+&80
```

Before using this routine in your own programs, make sure you have pushed all registers that are holding values that you want to preserve for use after the external command has executed.

Should you wish to pass parameters to the Rodos FORMAT routine, you will need to disassemble and study that routine to find out which registers hold which parameters. Or you could ask Romantic Robot. I see no reason why they shouldn't part with such information – other companies do so quite freely. Phone them on 01 200 8870 if you get stuck.

Speech impediment

MY dad bought two games for his 464 which do not load correctly. Half way through loading the tape stops and nothing happens. Well, sometimes a few inks flash on the title screen, but that is it.

By accident he LOADed the first file – a binary one – before lowering HIMEM. A "memory full" error occurred of course, but then he rewound the tape and did a RUN" without resetting the machine and the program worked perfectly. This method works every time on both programs.

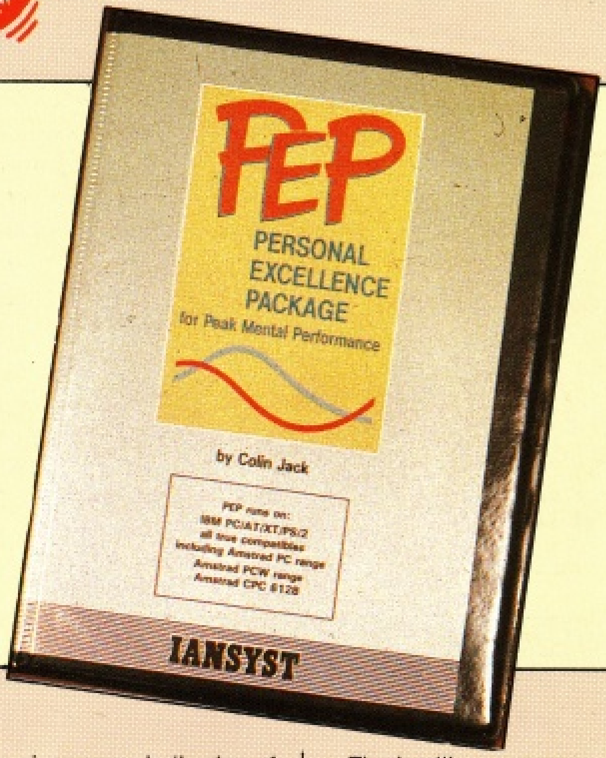
Could you please tell me why this happens? Is it an error in the computer? Is it anything to do with the SSA-1 speech synthesiser or the printer which are plugged in?

Andrew Moyns,
Bury St.Edmunds.

LD: *The problem might be caused by the SSA-1 rom grabbing a piece of ram for itself. Why not try running the games with it removed? Then again, it could be down to some tricky tape protection coupled with a dodgy cassette motor. If the problem persists with the SSA-1 removed, I should get your local dealer to check it out.*

"PEP" "TALK"

How much do you really know about yourself? Never fear, Dr David George is here with a little psychiatry



DO you fancy finding out what you always wanted to know but didn't dare to ask? Would you like to have a bit of fun at the same time? If so, the Personal Excellence Package – PEP – from Iansyst could be just the thing for you. PEP is a set of various kinds of question-and-answer tests, 12 in all, each designed to tell you a little more about your behaviour.

The tests have been grouped into four main sections: four intelligence tests, two personality tests, three performance monitoring tests, and three mental exercises.

Mental

The first mental exercise is supposed to measure your X factor, the mysterious quality that the opposite sex finds irresistible. Actually, it is just a series of questions designed to test how good you are at arithmetic and logic.

In the second of the mental exercises you have to type a series of sentences as quickly as you can, after which you are given some indication of your typing speed in words per minute. Then the program suggests a way of improving your speed and advises you to buy one of a number of typing improvement programs.

The third mental exercise is designed to see how good your short-term memory is. You are given an IQ equivalent for your efforts. This a load of baloney because there is no way of measuring IQ just from memory.

What is 6+5?
I have 14 talents.
You have 11 talents.
Sheila has 2 talents.
What is our average wealth in talents?

Chris is 6 years older than Bill.
Bill is 6 years older than Albert.
Albert is 8 years old today.
How old is Chris?

Xerxes sits on a golden throne.
Yaweh sits on a silver throne.
Zeus sits on a bronze throne.
Yaweh changes places with Zeus.
Who is sitting on the bronze throne?

Figure I: Some X factor questions.

David is shorter than Cyril.
Albert is taller than Bertie.
David is taller than Albert.
Who is the shortest, A, B, C or D?

Cheap is the opposite of:
1 NASTY
2 WEALTHY
3 DEAR
4 RICH
5 NICE

Type in the 3-letter sequence which comes next in the series.
CAC
DAD
EAE
FAF
???

Figure II: Test your own IQ

The intelligence tests are the ones which take most time. There are four of them, which you are recommended to take on four separate days.

You have to do mind-bending things like deciding which shapes could and could not be folded into cubes, and working out who is the tallest or shortest person after being given the appropriate information.

There are 100 questions in each of the four 20-minute tests. At the end of each one you're given some kind of IQ score, and there's also a fuller analysis of your achievement after you've completed all four tests.

Personality

The personality tests are in two parts – one tells you all about your public persona, and the other about your private persona.

The public persona test is concerned with the tough side of your personality, the qualities which make you a good leader or manager and may help you to get ahead in life. The private persona test is concerned with the tender side of your personality; the qualities which make you a worthwhile friend and an enjoyable person to be with. Or so says the introduction to these tests.

It goes on to say that *"... unlike the IQ tests, these assessments can be done profitably more than once"*. This seems to me like a nice way of telling us that if we don't like what we're being

told about ourselves then we should be a bit more economical with the truth the next time.

Performance

The three parts to this test are: Circadian rhythm, alcohol effects and stimulant effects.

The Circadian rhythm is the natural variation in performance we show throughout the day. We are more alert at some times than at others and to show up this rhythm you're asked to press the space bar if two letters out of the four on the screen are the same. You are to play this game at as many different times of the day as possible so that a final chart can help you plan your day better.

If you're teetotal, the second of these tests may prove rather problematic. The whole idea of the test is to show how alcohol affects the speed of your reactions. You have to try to keep a small square on the monitor as close as you can to a small circle that moves rapidly and erratically around the screen.

The stimulants of the third performance test are nothing more exciting than coffee and medicines. All you have to do is to press the space bar as quickly as you can after a bell has sounded and then tell the program how many cups of coffee you have just consumed or pills you have taken. You are given your response rate in milliseconds.

```
  PRIVATE PERSONA : DAVID GEORGE


  10 20 30 40 50 60 70 80 90 100
  :  :  :  :  :  :  :  :  :  :
======================================== :  :  :  : GENEROUS
============================================= :  :  : KIND
================================ :  :  :  :  : CHEERFUL
================================ :  :  :  :  : OUTGOING
================================ :  :  :  :  : SELF-SUFFICIENT
============================ :  :  :  :  :  : SHY
===================================== :  :  :  : TOLERANT
===================== :  :  :  :  :  :  : BORING
=============================:  :  :  :  :  : OPEN
============================================== :  :  : TACTFUL
======================================== :  :  :  : POPULAR
=============================== :  :  :  :  : SOCIABLE
===================================:  :  :  :  : SATISFIED
  :  :  :  :  :  :  :  :  :  :
  10 20 30 40 50 60 70 80 90 100
```

Figure III: Discover your inner self.

The verdict

PEP is certainly a pleasant way of passing a few hours, but you soon realise though that it is much more innocent than it sounds; after about 20 hours of working through it I don't know much more about myself.

As long as you don't take it too seriously and get hung up if your IQ is not up to scratch, then I recommend it. It's only a bit of fun after all.

Product: Personal Excellence Package
Price: £24.95 (disc, CP/M Plus only)
Supplier: Iansyst, Omnibus Building, 41 North Road, London, N7 9DP.
Tel: 01 607 5844

TO ORDER PLEASE USE THE FORM ON PAGE 65

PICTURE POWER

In every profession there are ways of doing things. Jill Lawson lets you in on some arty tricks of the screen designer's trade

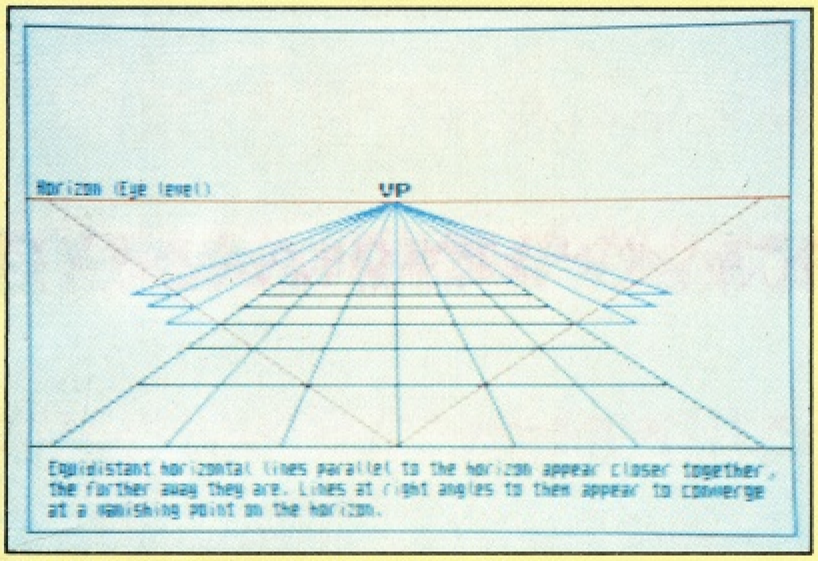


Figure I: Lines converge on the horizon at a vanishing point

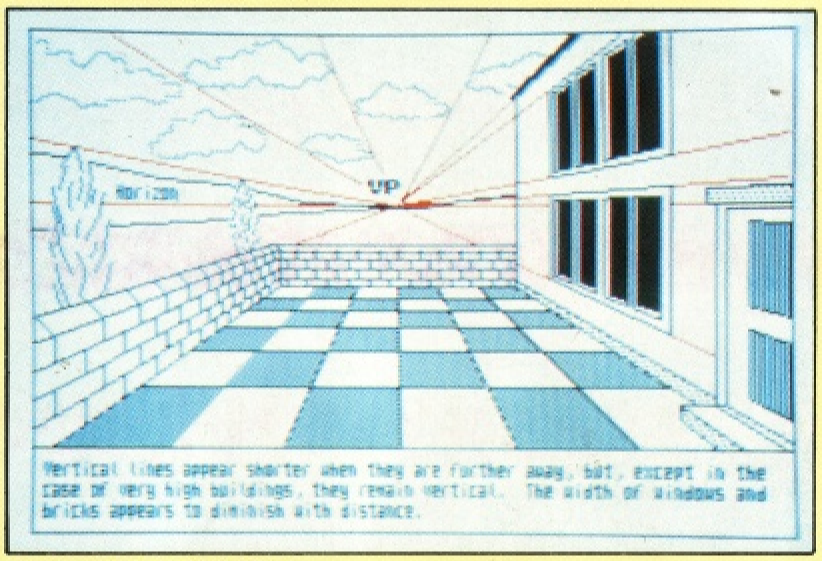


Figure II: Objects reduce in size . . .

Perspective

WITH regard to linear perspective I shall do no more than remind you of some of the basic rules since this is a complex subject. If you wish to explore it more fully, your library should have several helpful books.

In any drawing, the horizon line determines the shape and size of all objects in the picture. Most of you will know that railway lines appear to get closer together as they get further away, until they finally converge on the horizon at a "vanishing point" (see Figure I).

If you draw an object in the immediate foreground, then another identical object standing halfway between the bottom of the picture and the horizon will be half the height and width of the original.

A third, halfway between the second and the horizon, will be a quarter of the size (see Figures II and III). Bear this in mind when adding background detail to your work. Get it right and the picture will have real depth.

Tonal perspective is a method of suggesting distance by a clever use of colour. Anything in the foreground should be drawn in the strongest and brightest colours, while distant areas should use neutral pastel tones.

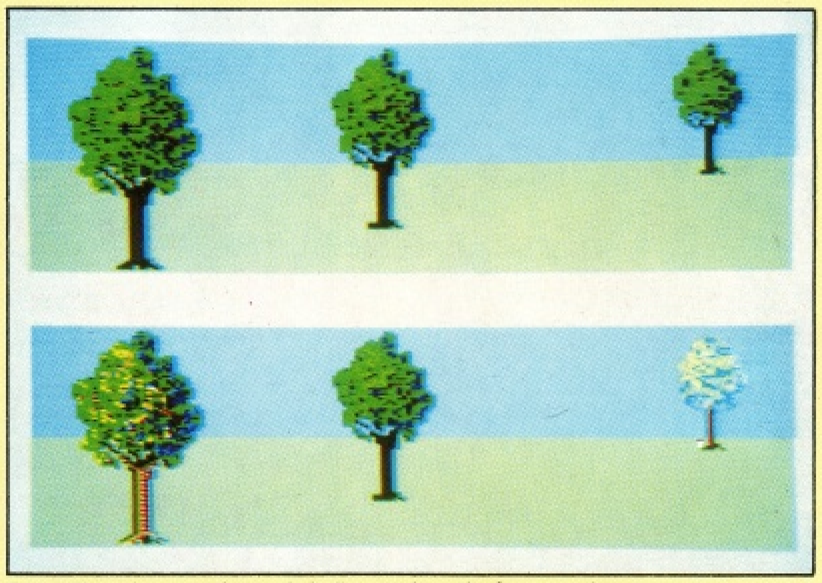


Figure III: . . . in proportion to their distance from the foreground

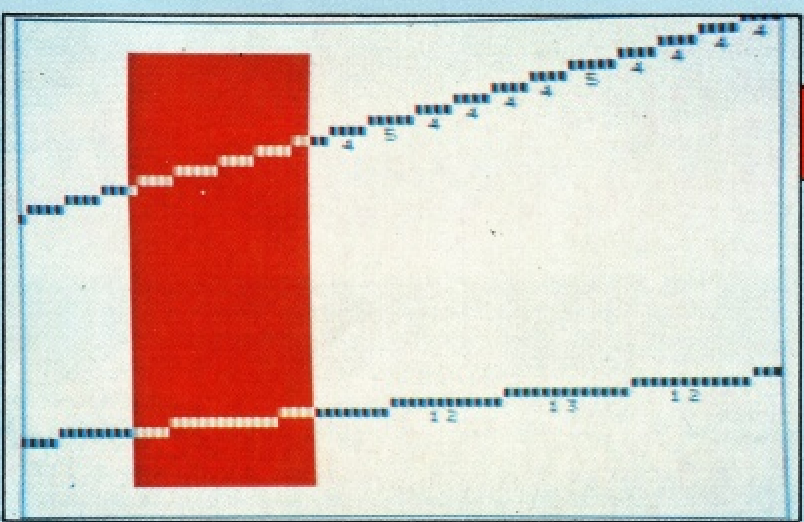


Figure IV: Zoom in to observe the pixel pattern

Protected inks

The opportunity to choose one or more colours which will be unaffected by any subsequent drawing function is offered by Advanced Art Studio.

In other utilities, using the spray (airbrush) facility can often result in more work tidying up afterwards than if you plotted the pixels individually, but by protecting surrounding areas sprays can be contained. This function also allows you to draw in detail behind objects in the foreground with a greater degree of accuracy, since the correct position and gradient of lines is automatically maintained.

To obtain similar accuracy with Screen Designer you should draw the line at one side of the object, zoom in to observe the pixel pattern from which it is formed, and, continuing that pattern, step across the object without plotting to find the exact point where the line should start again (see Figure IV).

Shadows and highlights

THESE add depth and authenticity to any illustration. Look carefully at the picture or object you are drawing. See which areas are in shadow. From this you will be able to determine the position of the principle light source (see Figure V).

You should make sure that any additions to the picture have the same light source – all shadows should be on the same side.

The lightest part of an object will be diametrically opposite to the area in deepest shadow. If the surface is matt then highlights will be just a little lighter than the rest, whereas white highlights will suggest a high polish.

Shiny objects may also pick up some degree of reflected light on the side in shadow, depending on the brightness of the surrounding area, but differences here will be subtle and well-diffused.

If you are drawing something from memory or creating, say, an alien craft, it is convenient always to assume that your light source is in the same place. For right-handed people the logical position is high over your left shoulder.

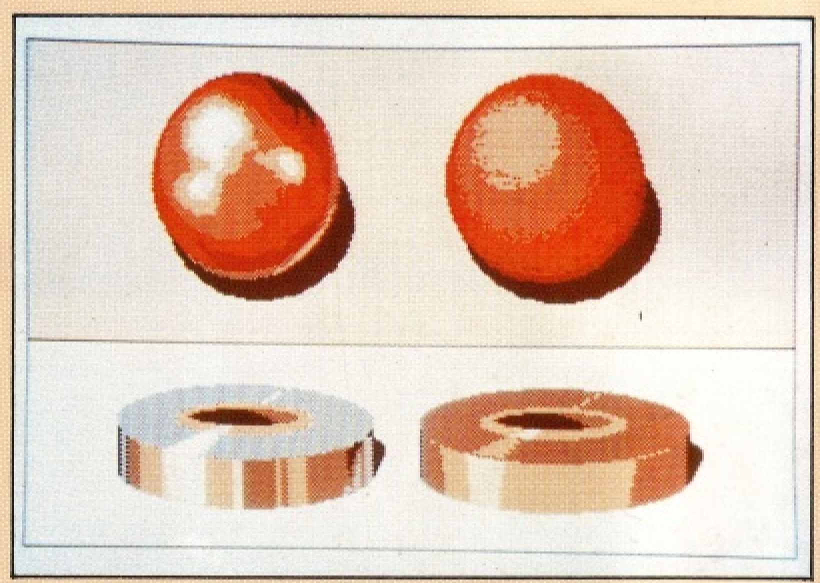


Figure V: Shadows and highlights add depth



Figure VI: You can mirror the image for reflection

Reflections

IF you have a lake or river in the foreground reflecting mountains, you may be able to use your art package's mirror facility (if you have one), though, strictly speaking, the reflection will usually be rather darker in colour (see Figure VI).

On the other hand, in the case of a boat or a jetty, you should remember that the réflection will not be a mirror image since the rules of perspective apply (see Figure VII).

Similarly, if a person is seen through a mirror behind them, it is as if the reflected image were twice as far away as the person is from the mirror.

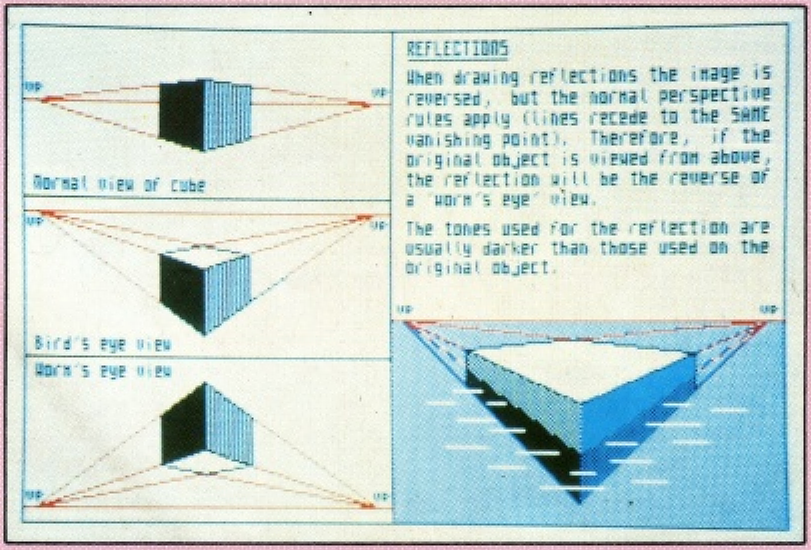


Figure VII: The rules of perspective still apply

Pattern fills

ALTHOUGH single-pixel stipples are the mainstay of creating good pictures in Mode 1, it is possible to design your own more complex patterns with Advanced Art Studio, and one or two other art utilities. These can work well if used in a relatively small area, and can save a lot of tedious drawing. A design that repeats itself at least every 16 pixels may be fine for drawing brick walls or patterned wallpaper (see Figure VIII, top), but you should beware of using one pattern to fill large areas, since the regular repeats can look most unconvincing, especially for vegetation.

A better plan would be to design two or three bush or tree brushes, and plant them individually (see Figure VIII, bottom).

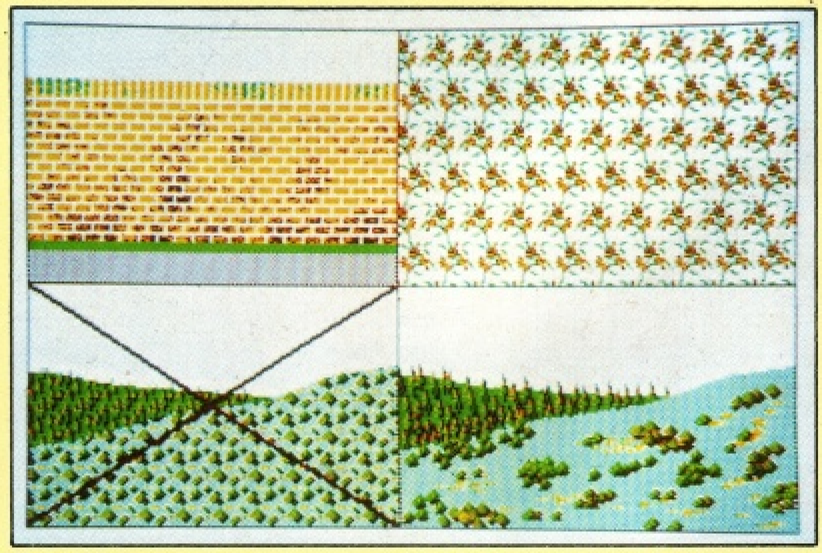


Figure VIII: You can design your own complex patterns

Text

OFTEN you may wish to add some wording to your screen design. If all you require is a title at the foot of the screen or a couple of labels, then the system text (available with most utilities) will do the job. If, however, you need display text then there are a few points to note.

Studio comes with a variety of fonts, usable in many different sizes and styles, but, because they are all designed on an 8 x 8 pixel grid you will notice that the space between letters varies, giving an untidy appearance.

Much can be done to improve this by making use of your "cut, clear and paste" to close up spaces on either side of an I and to increase spaces between any letters with straight uprights like MA.

Your aim should be to have an equivalent area of white space between each letter. Also, when using the larger sizes of text you will see that the outlines become very jagged, and these will benefit if they are smoothed out.

Remember that if a letter occurs more than once you may be able to use your cut and paste (perhaps in conjunction with the protected inks) to plant a redesigned letter in several places.

You can also use "block move" to obtain a three-dimensional effect if the text is cut, re-coloured and reprinted, offset diagonally from the original by a couple of pixels (see Figure IX).

Screen Designer poses problems when anything other than standard text is required. You cannot afford to make any mistakes, especially when the text will be drawn over parts of your picture, so make sure you save your work before you begin.

If you are using a four-colour palette it may be best to design your lettering on squared paper, or on an unused part of the screen, and then copy it, pixel by pixel, when you are satisfied with the result.



Figure IX: Block move can create a 3D effect

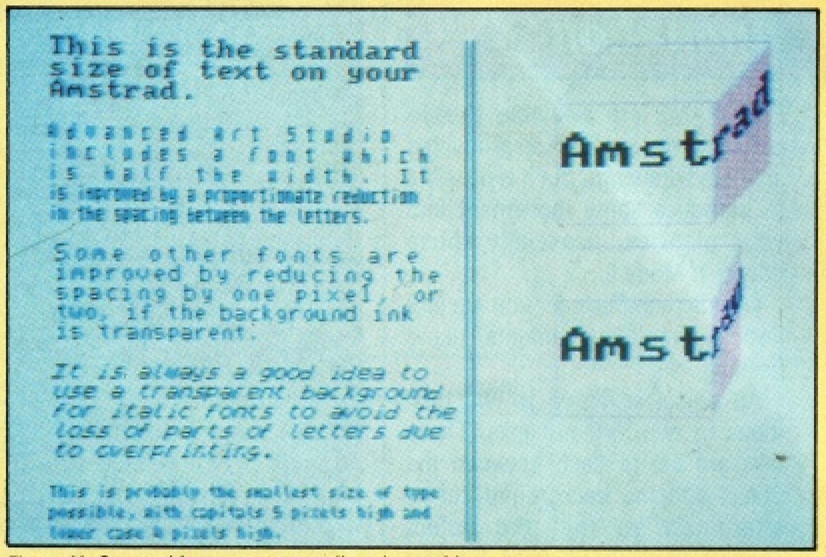


Figure X: Some objects are too small to draw with accuracy



Figure XI: My racing driver should have a red helmet

Words at angles

SOMETIMES your picture may include text within the original design – names over shops, on a car or boat, on street signs – and you may find that these are much smaller than any of the supplied fonts, of an unusual style, or viewed from an odd angle.

Because the human eye tends to see what it knows is there, an approximation of the actual letters is sufficient, but this will involve a certain amount of trial and error to achieve the best effect.

Similar trial and error will be needed for objects which are too small to draw with any degree of accuracy (see Figure X).

Compromise may also be needed where it is not possible to reproduce correctly all the colours in the original. When this happens, as it did with my racing driver, who should have had a red helmet, the only solution was to use one of the colours that was available – yellow.

As long as you don't choose anything too different from the actual colour it should be quite acceptable (see Figure XI).

Wash, and Wash Texture

SCREEN Designer has a Wash function which enables you to change one colour to a second colour by passing a character-size cursor over selected areas. It can also be used to remove all but one colour, which is useful for taking out unwanted detail.

Although a certain amount of manual tidying will be necessary, it is helpful when changing large areas. (In Studio something similar can be done within a window by changing or swapping inks).

Remember that you may not be able to reverse this process if some of your changed areas have joined up with parts of the picture that were already drawn in the same colour.

This should not be confused with Wash Texture in Studio with which you can texturise your last operation.

Washing a stipple on to a line or shape will give a dotted line/outline, and attractive effects can be produced by washing a pattern onto a line of text.

Windows

THIS is where Studio owners score a big plus over Screen Designer users.

The Greenland picture (Figure VI), which took many hours to draw, could have been produced in almost half the time with a cut, paste and mirror facility.

Most window functions are easy to understand – with some initial practice in discovering the many ways in which you can manipulate areas, you will soon feel confident using them to save time and to achieve spectacular results.

Beginners might be wise to leave the OR, XOR and AND options alone except for producing psychedelic pattern effects or, in Mode 2, using the XOR to change windowed areas area negative in an already filled area.

Animation

PROGRAMS are available specifically for the purpose of producing animated drawings, but it is possible to introduce some movement into your pictures, especially those drawn in Mode 0.

With Screen Designer you are limited to simple movements, using flashing inks.

An object is drawn in two positions in two different inks. These inks are set to flash between the object and the background colour alternately so that the object appears to move between the two positions. If the two positions overlap the area common to both is filled in a third ink in the object colour.

Rather more sophisticated effects are possible via the colour-cyclimg in Studio.

Avoiding the background ink and those used for program information, draw the same object in a succession of up to twelve different inks. Re-colour each object with eleven of the twelve cycle positions set to the background colour, and one to the object colour.

Its position on the cycle chart should move on one position for each object position. Get this right and the object will appear to move across the screen.

By designing a brush with wavy lines of four colours (for example, three blues and white) and applying this randomly to fill the desired area, then cycling each of the four colours progressively, it is possible to simulate a waterfall effect (see Figure XII – waggle the page up and down a bit).



Figure XII: You can simulate a waterfall effect

Printing

WITH Art Studio you have a built-in ability to dump your drawings to a printer capable of bit image graphics, with different colours being represented by varying stipple densities.

For most other art utilities you will need an additional printer pack, or you will need to write a program to do this for you.

Because two colours which appear quite different on the screen may be close together on the grey scale, you can sometimes improve the printed output by changing one or two temporarily so that the range of colours are (numerically) as far apart as possible.

A drawing with lots of detail will probably look best around A5 size, but simpler line drawings and most mode 2 work will reproduce well in smaller printouts.

Stardodger I – the Basic version



Stewart Russell shows you how to program the same game three times, in three very different languages

STARDODGER is a very simple game that remains challenging despite the lack of fiddley bits. It was produced as a test exercise to determine the suitability of three languages – Basic, BCPL and Assembly language – for writing a simple game.

The gameplay is about as simple as is humanly possible. The player guides a zig-zag line towards a goal on the other side of the screen, avoiding static objects placed in its path. The higher the level, the more objects are placed on the screen, until the player collides with an object or the white edge of the screen, ending the game.

The game is made even simpler for both programmer and player by the use of the Shift key as the only means of control. If the Shift key is pressed, the line climbs; if it is released, the line falls.

Basic was used to write the original program as it has the advantage of instant access. This allows a deal of experimentation and correction while testing without lengthy recompilation sessions.

Despite its speedy reputation, Locomotive Basic is a little slow for this sort of thing, so the game was later rewritten in a compiled language for speed.

Subprograms

The Basic program was written as a series of simple subprograms tacked together with that most marvellous keyword, GOTO. This keyword gives rise to cheers from some and hisses from others – generally computer scientists who have been bitten by a rabid GOTO at an early age.

The most complex part of the game is the check on whether the pixel in front of the player's line is white; if it is, the game ends. A test is also made to determine whether the right-hand edge of the screen has been reached; this results in the next screen being drawn.

It was found that the game was very slow when written in this manner since two independent tests – TESTR and XPOS – were required every game loop.

This was solved by drawing a vertical line in a different ink to the rest of the game graphics at the right-hand edge of the screen. Now all that was required was one ink test per loop, using TESTR, to see if the player had hit the line or had hit something nasty.

There were plans to include sound – these were shelved when it was discovered that sound programming is not one of my strongest points. This programming technique is know among the cognoscenti as The Cop Out.

As the variable names used are not descriptive, a table of their function may help (see Figure I). These variables hold integer values only, so it could be an interesting (and simple?) exercise to use a Basic compiler on the program.

● *Next month we'll look at the BCPL version.*

```
1 ' Basic Stardodger' by SCR.
2 '
10 ' ** Initialise **
20 MODE 1
30 INK 0,0
40 BORDER 0
50 INK 1,26
60 INK 3,0
70 q=5 'set initial asterisks to 5
80 ' ** Title screen **
90 LOCATE 16,1
100 PRINT"Stardodger"
110 LOCATE 1,5
120 PRINT "Avoid the killer Asterisqs,
    and seek the"
130 LOCATE 9,6
140 PRINT "wondrous Nextscreen Gap."
150 LOCATE 12,13
160 PRINT "Use SHIFT to climb"
170 GOSUB 700
180 ' ** Draw game screen **
190 MODE 1
```

```
200 DRAWR 629,0
210 DRAWR 0,170
220 MOVER 0,60
230 DRAWR 0,169
240 DRAWR -629,0
250 DRAWR 0,-399
260 DRAWR 0,2
270 DRAWR 627,0
280 DRAWR 0,168
290 MOVER 0,60
300 DRAWR 0,167
310 DRAWR -625,0
320 DRAWR 0,-399
330 MOVE 636,0
340 DRAW 636,399,3
350 MOVE 638,0
360 DRAW 638,399
370 PLOT -1,-1,1
380 TAG
390 FOR s=1 TO q
400 MOVE 50+RND*561,20+RND*361
410 PRINT "*";
420 NEXT
430 TAGOFF
```

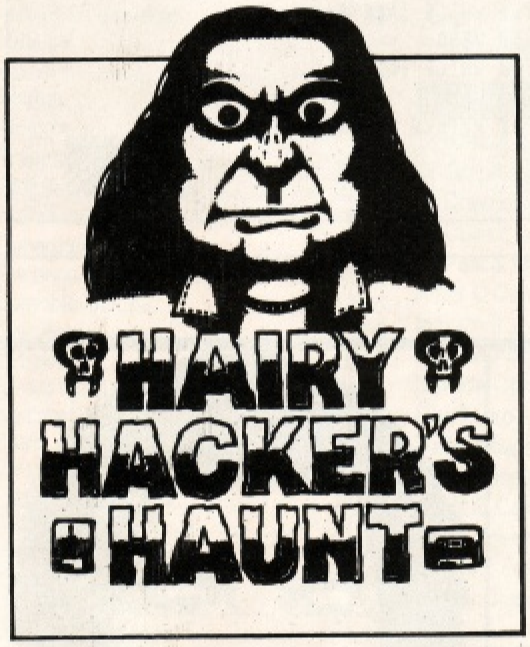
Q	Number of stars plotted on screen. Equal to (screen number)*5.
DY	Vertical line increment. Negative if line is falling, positive otherwise.
T	Ink number tested in front of plotted point. Can be: 0 – No action taken. 1 – Hit something white, hence game over. 2 – Hit invisible lines drawn at right of screen.

Figure I: The main variables in the Basic version

```
440 MOVE 0,200
450 dy=4 'set initial line dir to up
460 ' ** Main game loop **
470 DRAWR 4,dy
480 IF INKEY(21)<>-1 THEN dy=4 ELSE dy
    =-4 'move up if shift pressed
490 t=TESTR(2,dy/2)
500 IF t=1 GOTO 550 'hit summat nasty
510 IF t=3 GOTO 620 'completed the scr
520 MOVER -2,-dy/2
530 GOTO 470 'repeat main loop
540 ' ** End of game screen **
550 MODE 1
560 PRINT TAB(16);"YOU GOOFED"
570 LOCATE 5,13
580 PRINT "Number of Screens completed
    = "+STR$((q/5)-1)
590 GOSUB 700 'Press any key to cont..
600 RUN
610 ' ** Success screen **
620 MODE 1
630 PRINT TAB(16);"WELL  DONE"
640 LOCATE 10,13
650 PRINT "Stand by for Screen "+STR$(
    (q/5)+1)
660 GOSUB 700
670 q=q+5 'add 5 stars to next screen
680 GOTO 190 'screen drawing routine
690 ' ** Wait for key **
700 LOCATE 8,25
710 PRINT "Press any key to continue."
720 WHILE INKEY$<>""
730 WEND
740 WHILE INKEY$=""
750 WEND
760 RETURN
```

The bug bites back

Lance Davis fills in for a bug-ridden Vax



POOR old Vax. It's been a worrying month for him, what with Suz almost ready to do the business and all. Not the best time to go down with viral gastro enteritis, is it? Poor old Vax. Still, the poke must go on, and the Ed's asked me to do a last minute deputy hacker job. Not an easy thing to do when this month's contributions are stuck in quarantine somewhere in South London.

But I've got some maps, some old pokes, some new pokes and the much requested Hacked So Far bit (cue boos, hisses and cries of "We want Vax") so the column isn't a total write-off.

First away this month is a Belgian by the name of Gino Vertriest. Gino popped us some patriarchal pokes in the post on the half chance that some of them hadn't been published yet. To our great surprise, three out of the four were not in the Hacked so far index.

So to start Gino's ball rolling here's a poke to give you everlasting doobries in the Loriciel classic, 3DFight:

```
10 '3DFIGHT
20 'Gino Vertriest
30 OPENOUT"d":MEMORY &3E7:CLOSEOUT
40 LOAD"3dfight.bin"
50 POKE &C17,&A
60 CALL &5DC0
```

You'll go ape over this one. It does something unmentionable to Micro Power's Killer Gorilla:

```
10 'KILLER GORILLA
20 'Gino Vertriest
30 MEMORY &40FF
40 LOAD"kong2"
50 POKE &4415,&9
60 CALL &4100
```

In days of old when knights were bold and Melbourne House wasn't owned by Mastertronic:

```
10 'SIR LANCELOT
20 'Gino Vertriest
30 MEMORY &4267
40 LOAD"lancelot.bin"
50 POKE &8203,&9
60 CALL &7918
```

Gary Parr of Eastleigh wants to know why the Skate Rock poke in the June issue didn't work. Wel, it's becuse it contaned one or two misprits. Here it is again in its entirity:

```
1 ' Infinite lives for Skate Rock tape
2 ' (C) 1988 Justin for ACU
3 '
10 MODE 1:MEMORY 12345
20 tot=0
30 FOR n=&100 TO &111
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>1502 THEN PRINT"Goofed agai
   n. Check the data":END
80 LOAD""
90 CALL &100
100 DATA 21,09,01,22,6f,90,c3,52
110 DATA 90,3d,b7,32,19,57,c3,0a
120 DATA 40,4a
```

P.Dudek of Tilbury has been eyestraining, gutrending and stickmangling over Starfox. The result of all this unsociable activity is the coordinates for all the planets:

Rehtona 23,82,15	Draygon 51,10,39
Vectar 10,56,47	Jantus 32,08,93
Mysto 22,42,46	Bolos 43,18,19
Phalba 81,70,23	Psylon 49,12,09

Coordinates for Starfox

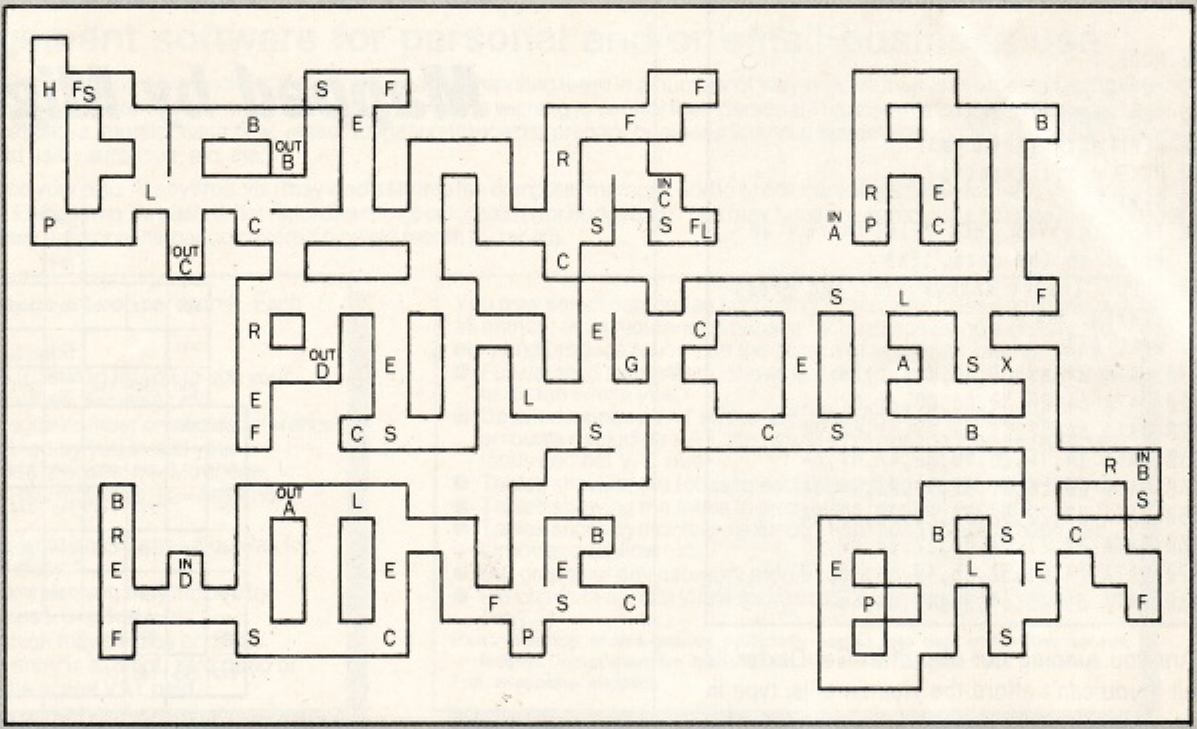
Mr Dudek also says he's getting desperate for

Hacked so far in *ACU*

3DC, Nov 87
3DFight, Sep 88
Academy, Jul 87
Agent X II, Mar 88
Airwolf II, Nov 87
Amsgolf, Jan 88
Anarchy, May 88
Apprentice, Jan 87
Arkanoid, Jan 88, May 88
Army Moves, Aug 87
Asterix, May 88
Avenger, Feb 87
Back to Reality, Feb 88
Ball Breaker, Jun 87, May 88
Batty, Jan 88
Binky, Sep 87
Bomb Jack, Sep 86
Bosconian 87, Jan 88
Bounty Bob Strikes Back, Dec 86
Brian Bloodaxe, Dec 87
Buggy Boy, May 88
Cauldron, Jul 87
Cauldron II, Oct 86
Caves of Doom, Nov 86
Chronos, Jul 87
Chuckie Egg, Jun 88
Chuckie Egg II, Oct 86
Combat Zone, May 88
Commando, Jan 87
Corridor Conflict, May 88
Covenant, Aug 86
Curse of Sherwood, Jun 87, May 88
Dark Side, Sep 88
Death Wake, Feb 88
Death Wish III, Dec 87
Defend or Die, Jul 86
Dizzy, Dec 87
Donkey Kong, Apr 87
Driller, May 88
Druid, Dec 86
Elevator Action, May 87
Elite, Jul 86, Jun 86, Mar 87, Nov 87, Dec 87
Enduro Racer, Aug 87
ErBert, Sep 86
Exolon, Nov 87
Fairlight, Aug 86, Jul 88
Firetrap, Mar 88
Flying Shark, Jun 88, Jul 88
Four Smash Hits, Apr 88
Freddy Hardest, Mar 88
Frost Byte, Jan 87
Fruity Frank, Jun 88
Future Knight, Apr 87
Galletron, Sep 87
Galvan, Jan 87
Game Over, Nov 87
Gauntlet, Apr 87, May 87
Get Dexter II, Sep 88
Ghost Hunter, May 87
Ghosts'n'Goblins, Sep 86, Dec 87, Feb 88
Glider Rider, Apr 87, Jun 87
Gobots, Aug 87
Goonies, Apr 87, May 88
Green Beret, Sep 86
Gryzor, Apr 88
Gunfright, Nov 86
Gurianos, Nov 87
Guzzler, Dec 86
Head over Heels, Jun 87
Heartland, May 87
Hi Rise, Jun 87
Ikari Warriors, Feb 87
Impossiball, May 87
Infiltrator, Jul 88
Into Oblivion, Jun 87
Into The Eagles Nest, Apr 87
Jack the Nipper, Sep 86
Jack the Nipper II, Mar 88
Jackyl & Wide, Aug 87
Jailbreak, Apr 87
Jet Set Willy, Jun 87
Jet Set Willy II, Jul 87, Aug 87
Karl's Treasure, Sep 87, Nov 87
Karnov, Sep 88
Kat Trap, Apr 87
Killer, Jul 87
Killer Gorilla, Sep 88
Killer Ring, Oct 87
Knight Lore, May 88
Knightshade, May 86

METAPLEX

Mapped by Steve Webb



KEY

(X) Start location.
(G) The evil two headed Garth who you must destroy. Garth gets his energy from four power units located around the complex. You must destroy each power unit by dropping a flask of acid on top of it. When you have destroyed all the power unit Garth will be sufficiently weak for you to shoot him. You can then locate the hatchway from which to escape.
(P) The four power units.
(F) Possible locations of empty flasks. The actual location and number of flasks vary with each game and depend on which difficulty level you are playing.
(A) The acid room where you can fill up and empty flask. Once you have filled it up you can take it to one of the power units to destroy it.
(B) Bonus points.
(C) The locations of spare craft. If your craft becomes crippled then you must try and locate a new craft.
(H) Hatchway through which you must escape after shooting Garth.
(IN/OUT) The inputs and outputs of four transporters.
(R) These will replenish your shield level.
(L) Lazer refill points. Land on them to top up your lazer power.
(E) Electrical lines which block your pathway. You can switch them off by using the security sensors. The electrical lines are active if the wavy symbol is shown in the status panel.
(S) Security sensors. To operate them, land on top and press fire.

an Aliens poke. Will Mighty Joe's map do?

Christopher Thornton of Riccall in North Yorkshire has discovered a couple of keypresses. The first gives you infinite lives, a never-ending shield, bottomless fuel and bangs of hyperbombs in Combat Zone.

If you press the Shift, Caps Lock and Tab keys in pause mode, all will be revealed. Oh yes, apparently you need to bang the keyboard around the Escape key area after this has been done.

Christopher's second discovery is for Ollie & Lissa: Press Shift-Z to move along a screen, and Shift-X to get back.

Karnov is a toughie, isn't it? Well I think it is, and I could have kissed Justin (metaphorically speaking, of course) when I discovered a poke for infinite lives tucked away on the latest disc of cheats to reach *ACU*. Sorry chaps and chapettes,

but this is for the disc version:

```
1 ' Infinite lives for Karnov (disc)
2 ' (C) 1988 Justin for ACU
3 '
10 MODE 1
20 tot=0
30 FOR n=&80 TO &C6
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>5909 THEN PRINT"There's an error in the data.":END
80 INPUT "Insert KARNOV disc and press ENTER ",a$
90 CALL &80
100 DATA 21,c5,00,cd,d4,bc,79,22
110 DATA 64,00,32,66,00,af,67,24
120 DATA 6f,57,5f,0e,41,df,64,00
130 DATA 14,14,26,90,0e,47,df,64
140 DATA 00,c6,df,32,51,02,21,64
150 DATA 00,22,52,02,2e,00,22,54
160 DATA 02,21,ba,00,22,06,02,c3
170 DATA f3,01,32,db,40,c6,18,32
180 DATA df,40,c3,00,40,84,4a
```

Are you running out of puff in Get Dexter II? Well if you can't afford the vitamin pills, type in Justin's infinite energy poke. It'll do wonders for your wotsits:

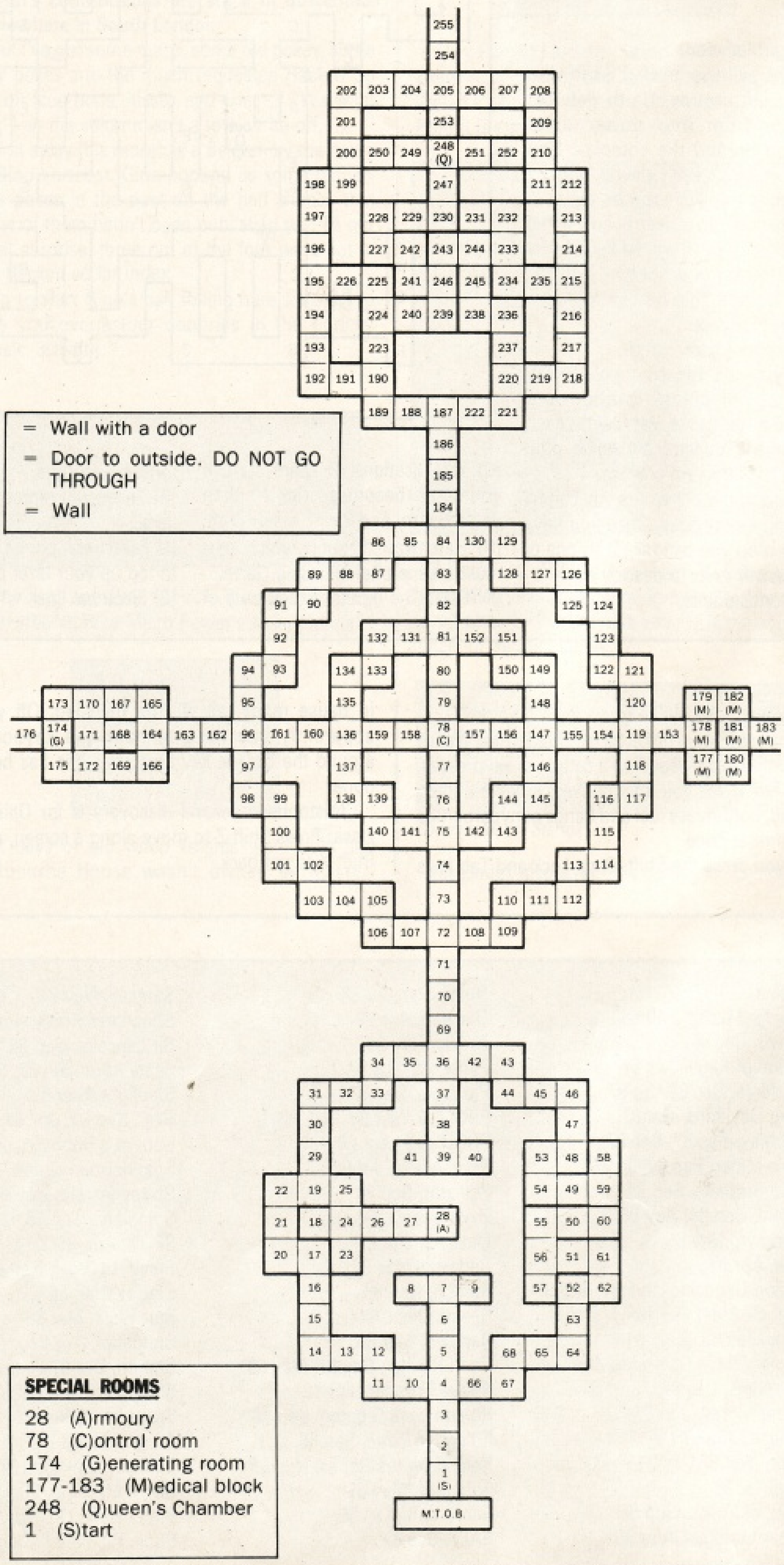
```
1 ' Infinite energy for Get Dexter II
2 ' (c) 1988 Justin for ACU.
3 '
10 MODE 1:OPENOUT "d":MEMORY &3E7
20 INPUT "insert DEXTER II disc and press enter ",a$
30 LOAD "Pandora.kev",&3E8
40 POKE &3F2,&C3
50 POKE &3F3,0
60 POKE &3F4,1
70 DATA cd,ab,04,af,21,00,00,32,ce
80 DATA 14,22,cf,14,c3,f5,03,4a
90 FOR n=&100 TO &10F
100 READ a$:POKE n,VAL("&"+a$)
110 NEXT n
120 CALL &3E8
```

Last, and by no means least, Justin's done the works on Incentive's Dark Side. Infinite everythings to get you tracing those tracks to success:

```
1 ' Infinite time, shield and fuel
2 ' for Incentive's DARK SIDE.
3 ' (c) Justin for ACU
4 '
10 MODE 1:MEMORY 12345
20 tot=0
30 FOR n=&BE00 TO &BE1F
40 READ a$:a=VAL("&"+a$)
50 POKE n,a:tot=tot+a
60 NEXT n
70 IF tot<>3168 THEN PRINT"Error in the data.":END
80 INPUT "Insert DARKSIDE disc and press enter ",a$
90 LOAD "dark":CALL &BE00
100 DATA 21,0f,be,e5,af,21,0b,40
110 DATA 36,c3,6c,2c,77,6f,e9,af
120 DATA 32,3e,6e,32,9d,65,32,0a
130 DATA 6e,32,7b,6f,c3,62,1c,4a
```

Right. That's my lot. Prizes for almost everyone mentioned and Get Well Soon, Vax, because I reckon I could get the hang of this. But tell me, what should I do with all these rotten tomatoes?

ALIENS
Mapped by Mighty Joe



WELCOME once again to the exciting world of Auntie John's machine code. As you may know, there is a short delay between when I write this and when it actually appears in print. This delay is typically about 15 years, which means I am writing this is 1973.

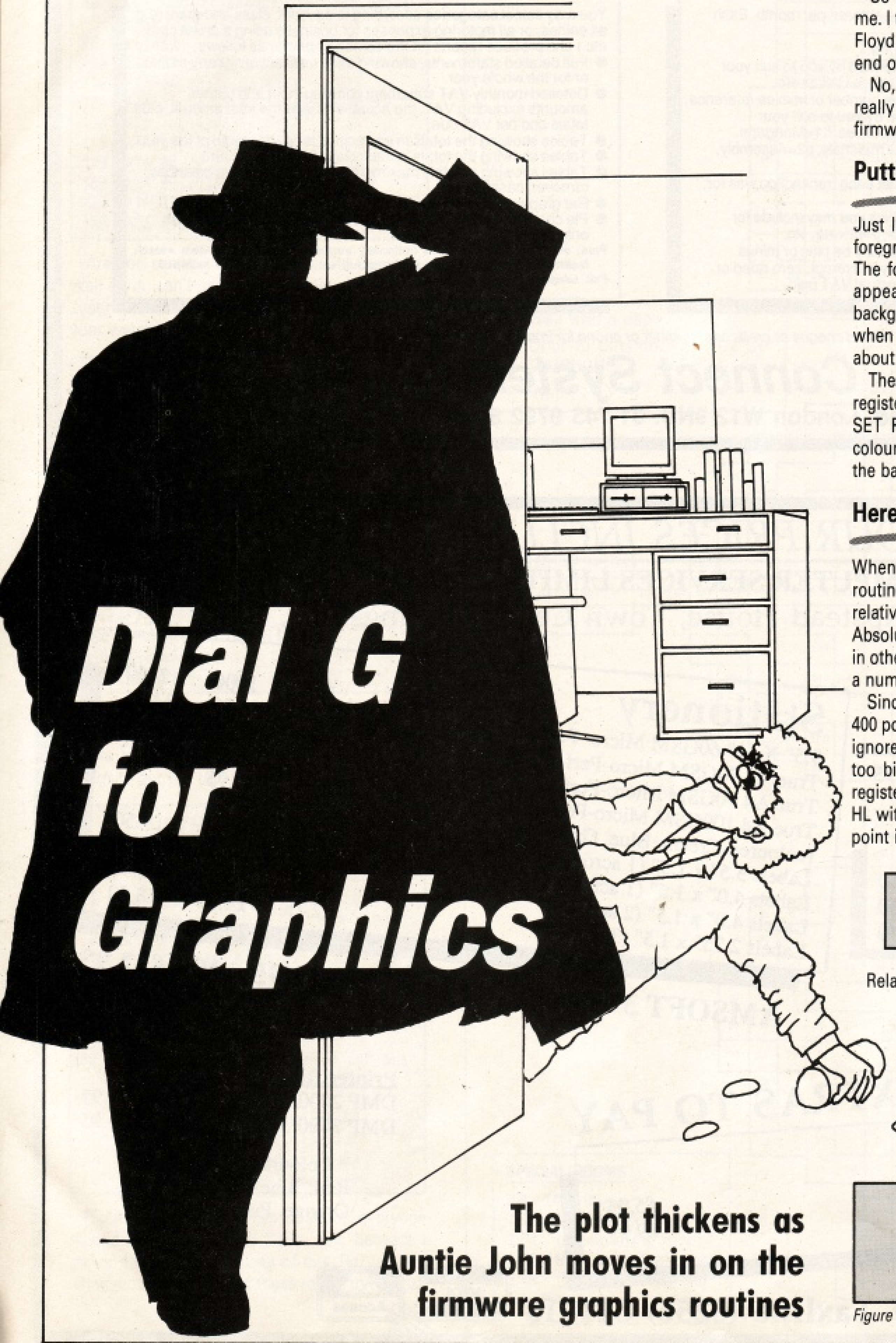
This presents me with some problems, not least the fact that I am only six years old. Also, since Z80 microprocessors won't exist for a number of years yet, I am in a sense working blind when I give specific listings. I hope you will bear this in mind if any mistakes crop up. Thank you.

So back to reality, and this month we're going to take a look at the set of Firmware calls that deal with everyone's favourite topic: Graphics.

These calls are particularly simple, and deal with moving, plotting, testing, drawing and setting up graphics windows. In fact, you can't do anything from machine code that isn't a lot easier from Basic, and the speed of machine code does not really make any difference when plotting pixels.

So why bother looking at it at all? Sure beats me. I tell you what, I'll go and listen to some Pink Floyd and you talk among yourselves until the end of the column.

No, it doesn't work, does it? Deep down you really want to know all about the graphics VDU firmware calls. So here we go...



Dial G for Graphics

The plot thickens as Auntie John moves in on the firmware graphics routines

Putting pen to paper

Just like in Basic, the graphics routines have a foreground and background colour to work with. The foreground is the colour that all the points appear in when you PLOT a point, and the background is the colour that the screen goes when you clear the graphics window – more about the window later.

These colours can be chosen by loading the A register with the ink required and calling GRA SET PEN (&BBDE) to change the foreground colour, and GRA SET PAPER (&BBE4) to change the background colour.

Here and there

When calling the plot, move, test and draw routines you have a choice between absolute and relative coordinates – just like PLOT and PLOTR. Absolute coordinates are given in 16 bit form. Or, in other words, two bytes. Or, in yet other words, a number from 0 to 65535.

Since the screen is always 640 points across by 400 points high, any values bigger than these are ignored. (Two bytes are needed because 640 is too big to fit into a single byte, innit). The DE register pair is loaded with the X coordinate, and HL with the Y coordinate. For example, to plot a point in approximately the middle of the screen:

```
ld de,320   ;x co-ordinate
ld hl,200   ;y co-ordinate
call &bbea ;gra plot absolute
```

Relative coordinates need signed 16 bit num-

Decimal = 42
Binary = 0010 1010
Invert 1s and 0s = 1101 0101
Add 1 = 1101 0100 = –42

Figure I: Converting to Two's-complement binary

```
      0010 1010  (42 in decimal)
  +   1101 0110  (-42 in decimal)
      ----------
    1 0000 0000  (0 in decimal)
    the overflow bit is ignored
```

Figure II: Checking the result

bers. If you haven't come across the concept of signed binary numbers, then you have a treat in store. Here is a quick explanation.

Sign of the times

With eight bits, you can represent the numbers 0 to 255, OK? Now, if we treat the same eight bits in a different way, we can get them to represent the numbers –128 to 127. Nothing has changed in the binary number itself, its just the way we treat it.

The technique normally used is called Two's-complement, and to convert a positive binary number to its negative Two's-complement you just change all the ones to zeroes, all the zeroes to ones, and add one. An example, using the number 42, can be seen in Figure I.

So, the Two's complement of 42 is – in binary – 11010110. Notice that in decimal this number could be taken to be 214. Adding 42 and 214 gives 256, but since we are using 8 bit numbers, this leaves with us the value zero, which is what you would expect when you add 42 and minus 42. See Figure II if this is confusing you.

Of course, if your assembler allows you to put a minus sign in front of numbers – like LD DE,–10 – then you don't have to know any of this. Still, it's nice to know what's going on. So I'm told.

So, DE and HL are loaded with signed X and Y offsets, and then the routine is called. For example, to perform the equivalent to Basic's TESTR –2,4:

```
ld de,-2    ;or ld de,&fffe
ld hl,4
call &bbf3 ;gra test relative
           ;A now contains ink value
```

Drawing the line

The firmware LINE routine is the equivalent to DRAW in Basic. You supply the relative or absolute coordinates of the end of the line, call the relevant routine and the computer will draw a line from the last cursor position to the point you have specified.

The "last cursor position" is the last point you moved to, plotted, tested, or even finished a drawing an earlier line to. If you haven't done any of those things yet, the line will start from (0,0).

The example program in Listing I will draw a box in the current colour all around the outside of the screen. The routine draws a box starting from the bottom left, and proceeds in a anti-clockwise

```
org &4000

;gra move absolute
ld de,0
ld hl,0
call &bbc0

;gra line absolute
ld de,639
ld hl,0
call &bbf6

;gra line relative
ld de,0
ld hl,399
call &bbf9

;gra line absolute
ld de,0
ld hl,399
call &bbf6

;gra line relative
ld de,0
ld hl,-399
call &bbf9

ret
```

Listing I: Drawing a box around the edge of the screen

direction. I've used both relative and absolute coordinates to give you something to think about.

Other routines exist in the firmware to plot vertical and horizontal lines. These routines are SCR HORIZONTAL at &BC5F, and SCR VERTICAL at &BC62. Both require the A register to contain the encoded ink that the line is to be drawn in (encoded inks were mentioned last month). Since these routines duplicate functions already examined, there is little to be gained – except perhaps another paragraph – in examining them. So I won't.

Origin tonic

As from within Basic, you are allowed to change the origin of the graphics display – the "origin" is where the computer thinks the coordinates (0,0) are. Initially, the origin is at the bottom left-hand corner. This means all the coordinates used to plot any point of the screen are positive, which makes things nice and simple.

However, if you really want to, you can choose to put the origin anywhere in the screen that you like, and as an example we'll put it slap-bang in the centre, at coordinates 320,200. The code for this is:

```
ld de,320  ;x co-ordinate
ld hl,200  ;y co-ordinate
call &bbc9 ;gra set origin
```

Now if you were to use GRA PLOT ABSOLUTE with coordinates (0,0), the pixel would be plotted in the centre of the screen, at what used to be (320,200). Confused? Good. Now think of what you'll need to do if you wanted to plot a point at what used to be (100,100). Hmm, below and to the left of the origin. You'd need negative values, right? Which means good old two's-complement signed numbers again. Personally, I don't shift my origin around too often...

Clean windows

At last we come to the graphic window routines. These allow you to define an area of the screen to be used for graphics: Any points outside the window are not plotted, and when tested return the background ink.

To define a window, you must define first the left and right edges, and then the top and bottom edges. The coordinates used are all absolute, and don't depend on the position of the origin at all. That is, (0,0) is always the bottom left corner of the screen.

To define a graphics window in the centre of the screen:

```
ld de,160  ;left edge
ld hl,480  ;right edge
call &bbcf ;gra win width
ld de,100  ;top edge
ld hl,200  ;bottom edge
call &bbd2 ;gra win height
```

To clear the graphics window, simply call GRA CLEAR WINDOW at &BBDB which uses the current background ink. Using these routines, you could very quickly fill blocks of the screen to be any ink colour, and – unlike SCR FLOOD BOX – to pixel accuracy.

Chocolate digestives

Speaking of disc drives ... weren't we? Never mind, I find links very difficult. But I thought you might be interested to know who invented them.

About 10 years ago, in 1963, a Dr Hans Flexgutt was experimenting with digestive biscuits and the tricky problem of how to spread the chocolate over them in a nice even coating. He hit upon the idea of dropping a blob of melted chocolate on to the biscuit while rotating it at speed.

After several very messy experiments he discovered the exact speed to spin the biscuit and also developed the hardware needed to guide the chocolate spraying nozzle with the desired accuracy. It was with some surprise that he discovered that in the process of applying the chocolate in small bursts, he had invented the world's first disc-drive.

He went immediately to IBM with his invention, but they stole the idea and applied it to pizzas instead – and thus the eight inch disc was born. Dr Flexgutt was very upset about this and spent the rest of his days in the fruitless search for a substitute for food. Shortly later he was found dead in his laboratory by his assistant, a certain

Mr A.M.Sacarin. The post mortem revealed his stomach was full of iron filings.

However, now, in the '70s, a small company called Amstrad has rediscovered the chocolate digestive disc drive. Only time will tell whether or not it will become a viable proposition. Much development is needed – a small black plastic shell to put the biscuit in for a start, and probably a clear plastic box for protection.

Cunning logic

Finally we come the routine GRA WR CHAR at &BBFC, which is the firmware equivalent to Basic's TAG command. Remember TAG? You use it (very often, I don't think) to print text at the graphics cursor. This allows you to place letters and numbers to pixels instead of character squares.

The final example program (Listing II) uses this routine to print strings of text in a very pretty way. It also uses the SCR ACCESS routine (&BC59), which determines how a plotted pixel will affect any pixels that are already on the screen. It does this by looking at the pixel that already exists and performing a logical operation – AND, OR, XOR – with it and the pixel to be plotted. The result is a mess. Well, it is in most of my programs.

In Listing II we print text in one colour, then overwrite it in another colour, but move a pixel to the side and a pixel up. The cunning bit is the use of the logical operations, which still allow the original colour to show through.

Try experimenting with different ink values and different logical operations. The list of logical operations is in the Basic Users manual – in the section about Control Characters, beside character &17.

● *Until next month, take care and Keep On Assembling!*

```
org &4000           ;start of assembly

gra_move_absolute equ &bbc0
gra_set_pen       equ &bbde
gra_wr_char       equ &bbfc
scr_access        equ &bc59
scr_set_mode      equ &bc0e

ld a,1
call scr_set_mode ;choose mode 1
ld a,3
call scr_access   ;choose OR mode
ld a,3
call gra_set_pen  ;set graphics pen 3
ld de,100              ;position
ld hl,300                ;graphics
call gra_move_absolute   ;cursor
ld hl,message       ;point at message
call print_message ;print message

ld a,2
call gra_set_pen  ;set graphics pen 2
ld de,102
ld hl,302
call gra_move_absolute ;offset cursor
ld hl,message       ;point at message
call print_message ;print message

ret                  ;return to Basic

.message db "Amstrad Computer User",0

print_message
;
; A subroutine to print a string
; pointed to by HL at the current
; graphics cursor position and in the
; current pen and plotting mode.
; String must end in 0.
;
.loop
ld a,(hl)
cp 0
ret z
push hl
call gra_wr_char
pop hl
inc hl
jr loop

end                  ;end of assembly
```

Listing II: Printing strings in graphics mode

IMUG THE INDEPENDENT MicroLink User Group NEWSLETTER

Mass migration

To tie in with the announcement of a 1p/minute Prestel charge, MicroLink has now introduced a couple of additions to help Micronet emigres feel at home. The first, an extended Help system, lets users scan for any information on their chosen topic.

It's a big advance on the old systems, where finding the right answer was often more difficult than sorting out the problem that needed the help. Not everything is covered, but the new system is designed to complement the paper information provided to every subscriber.

The second addition is PCGold. This brings colour to MicroLink for the first time, if only for people who use IBM-compatible personal computers.

Menus and information is presented and colour-keyed, and other additions include a selection of reviews from Database magazines.

Response to the new features has been a bit muted from existing MicroLink subscribers, who have long been used to a text-based system instead of menus.

However, as an intermediate stage between the Prestel standard and the power of the MicroLink computer, PCGold should make the move from one to the other much easier.

Loadsamovers

The removal vans that daily ply the roads are hiding a big secret. Half of them are empty. It's no secret really; but when a van has delivered its load it's got to get back to base, and that could be a long journey with nothing on board.

Imagine the savings that could be made if there was some coordination. If a van was in the right area it could pick up a load for another company, saving petrol, time and money. Of course the big nationwide removal firms can do this already, but until now there's been no way for independents to pool their resources.

Now there's LoadLink. Run as a bulletin board on the MicroLink computer, it links up small removal and storage companies. If a subscriber has a load to be picked up from Scotland, he can put a message in the appropriate part of LoadLink.

All the other subscribers can read it, and if they've got a van in the area contact the company involved. They can then sort out all the details through electronic mail.

The service isn't limited to removal firms. Any company which thinks that it could benefit from the idea, and consequentially benefit everyone else in LoadLink, is welcome to join. So if you're regularly moving large amounts of anything around the country, it could be well worth while.

Potential LoadLinkers should contact Mike Starkey, of J.L.M. Communications Ltd who are organising the service. Their MicroLink ID is MAG70307.

Flights of fancy

A new category has been created on the Bulletin Board. Called AirLink, it came about after a selection of pilots, air enthusiasts and other flyers had just about taken over the Chatter section. To get rid of them and restore some semblance of order on the board, they were diverted to their own section.

But it's interesting stuff, as technical talk and stories mix with explanations and discussions about anything aviation. Guess which aircraft is "affectionately" known as the Technological Toothpick or the Screaming Anteater?

Or if that's too easy, do you know whether you're allowed to use a Z88 in flight? The answers to these, and many other, questions are all on AirLink.

Saving money

The best way of saving money on MicroLink is to reduce the amount of time you spend connected to the computer. I've been asked about this, and this is what I do to this end.

First, I always record everything I do while online to disc.

Next, I use MAIL READ ALL. This gets all my mail and displays it. It scrolls off the top of the screen too fast for me to read, but that doesn't matter 'cos it's all being saved to disc. Similarly, on the bulletin board I don't (usually) stop to read what's being said, I just plough on. Then I log off.

Offline, I look through my logfile with any old text editor or word processor. I compose replies to mail messages in a file in WPMAIL format (do INFO WPMAIL at the > prompt to find out about this), and bulletin board messages in separate files called BB1.DOC and so on. Then I go back online, send all my mail in one operation and send each file for the bulletin board.

Finally, every so often I clear out my file space by doing a >F command. This shows me all the files that take up chargeable space. I delete the ones I don't need by >DEL. Typically there's one called *MAILSAVE* which the computer insists on leaving about the place.

What other files you have depend on whether you're registered for telex or not, but any confusion can usually be cleared up with a quick message to MUG on the bulletin board. After all, that's what it's there for.

Old Mugshots never die...

...they simply hang around. Mugshot is the weekly (occasionally fortnightly) newsletter provided for MicroLink subscribers and published on the bulletin board. As more people get on the system, and discover MUG, they try and find out what's gone before. Reading through all the bulletin board messages is pretty tedious, but there is a scanning procedure for finding messages on the board.

After entering >BB, and 1 to access the Bulletin Board, type:

SC CA MUG FR MAG95816
SU MUGSHOT

This apparently incomprehensible string of gibberish breaks down to

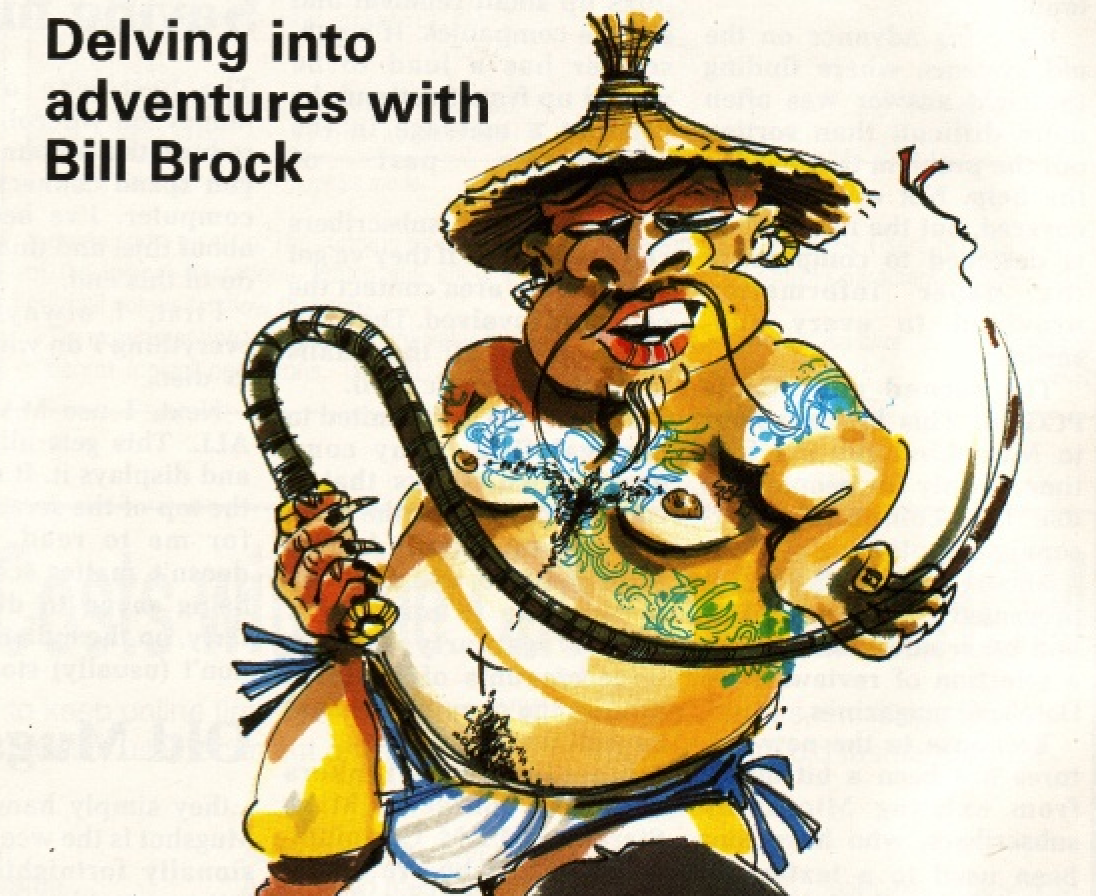
SC	= SCan ; show me the short details of messages
CA MUG	= CAtegory MUG ; only show messages in category MUG
FR MAG95816	= FRom MAG95816 ; only show messages from MAG95816
SU MUGSHOT	= SUbject MUGSHOT; only show messages with Mugshot in the subject field.

You'll see a list of numbers; typing these in as READ number will display the message in question.

Suggestions of material for inclusion in the MUG Newsletter should be sent to Rupert Goodwins on MAG95816

Seek and ye shall find

Delving into adventures with Bill Brock



THE latest CPC/PCW adventure to reach us from Activision is the long awaited Mindfighter. It has been written by Anna Popkess and programmed by Fergus O'Neill of Delta 4 Software and Abstract Concepts fame. Past adventures from the same team have all been hits, and have had their own brand of humour stamped firmly on the final product.

Mindfighter (the computer game) comes with the book of the same name and is a departure from their previous style, both in the method of programming and in the approach to the story content.

This adventure is the first to be written using their new operating system, Swan (System Without A Name). As the game has appeared across so many formats, it would suggest that the core of Swan is machine independent, an important advantage for programmers and distributors in today's hectic rush to meet launch dates.

Fergus' previous hits include The Boggit, Colour of Magic and Bored of the Rings. All have had very successful satirical story lines that have brought a very special brand of humour to the adventure scene.

Mindfighter is completely different. The story takes place in Southampton in 1987. The main character is Robin, a 14-year-old boy who has paranormal powers. He is one of four students whose extra sensory abilities are being studied by an old professor.

While suffering from a series of traumatic events, Robin tries to look forward in time to see the results of his forthcoming exams. To his horror he awakens in 1988 (the book says 1989, oops) to find that Southampton has been devastated by nuclear war.

In addition to the horrors of rotting bodies, starvation and the effects of radiation sickness, there is also the presence of The System – Chinese instigated bully boys who are using the survivors as slaves.

His friends back in 1987 manage to make contact and help him plan the defeat of The System and the freeing of their slaves. Having achieved this immediate objective, Robin returns to 1987 and the group sets about altering events to prevent the war ever starting.

Breaking the rules

I FOUND Mindfighter a difficult game to come to grips with. Any adventure must have a plot that fits a set of rules. Those rules and the logic that goes with them are defined by the writer.

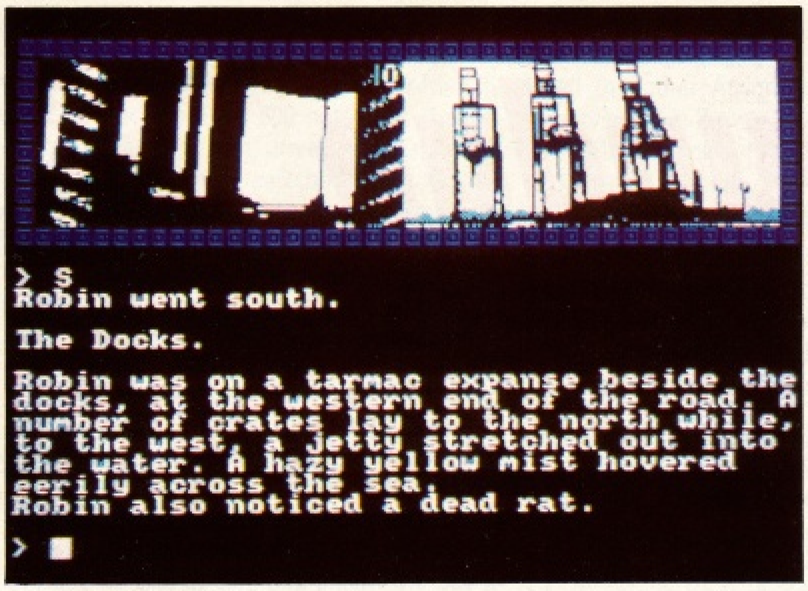
They may put you on a spaceship of the far future, among a magical world of swords and sorcery or playing Sherlock Holmes in a London of the hansom cab, but whatever the situation, a plot stands or falls on the interpretation and consistency of its own rules. If magic exists and trolls are always evil, casting a fireball at a group of trolls is an accepted action.

Mindfighter is very much a story that could happen today. It could well be viewed as a cry from the heart for a more sane approach to humanity's present problems. There is a 150 page book that develops these problems and the efforts of a small group to put them to rights.

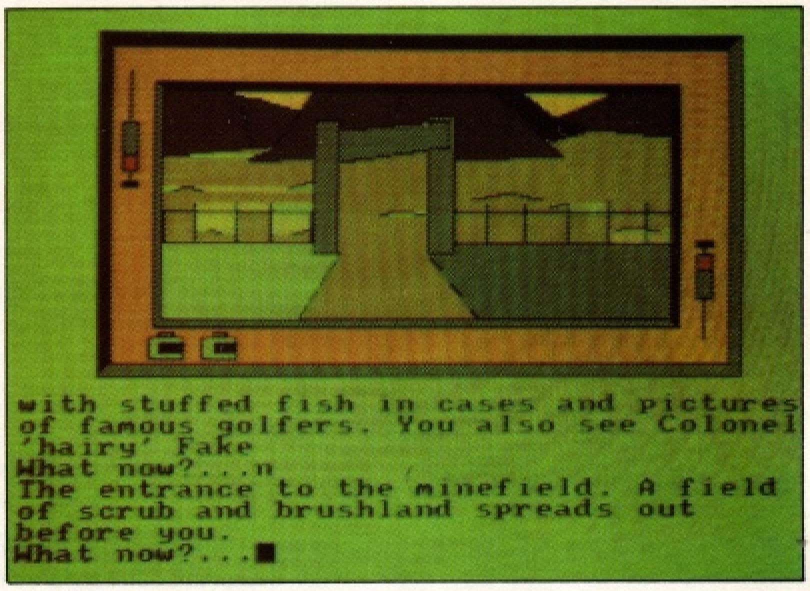
The preface of this book attempts to justify civil disobedience with a quotation by Albert Einstein. There is nothing wrong with this, it is a view held by many people today. But the inconsistency of this becomes all too clear when you learn that the hero of the piece, Robin, killed both his parents, killed the father of one of his friends and ultimately forms a group that will kill the ruler of Iran.

Whatever the justification for these actions, it is not following the theme of civil disobedience but that of anarchy. However much one wants to believe in the power of the mind and the right of the individual to take direct action, the setting is not an alternative universe, but here and now – in Southampton.

Without the book to back up the adventure I'm



Mindfighter from Activision



Smashed by Alternative

sure I would not have had these misgivings. The discrepancies derive from the book and not the computer game, but reading the book appears necessary to learn what the game is all about.

The parser accepts complex commands, and there is some interaction with several independent characters. Five letters need to be entered before a word is recognised, and responses to commands not actioned could be a little better than "That wasn't possible" and "I didn't understand that". Graphics accompany each location, but the same small group of pictures is used repeatedly. Nevertheless they are well drawn and fully support the story's atmosphere. The descriptive text pictures the stark reality of post nuclear desolation and although not for the squeamish, it does set the scene for Robin's adventure very dramatically.

Mapping is very important; Mindfighter is one of those adventures that is totally illogical with regards to movement between locations. Some have exits or entrances that are only accessible in one direction. In some places you travel east to go west. And most confusing of all is when you go south, turn round and go north to another location altogether. Although I do not approve of this confusion for confusion's sake, it certainly adds another aspect to the normal business of mapping.

Pressing Return without having entered any command brings up the icon display. By using the arrow keys this allows you to choose a number of standard options including ram, disc or cassette save/load of the game position and sending the descriptive text to a printer.

Altogether, I think that Mindfighter is an interesting exercise in computer adventures. The game is good, if a little difficult, but it is let down by the book.

Medical disaster

I SUPPOSE we should be used to slightly whacky adventures from that devious mind of Charles Sharpe. The latest to grace my CPC is yet another cheapie from Alternative Software called Smashed, very loosely based on the TV program of a similar title. The year is 1951 and the place is Korea. You have very recently qualified at medical school and now find yourself, diploma in hand, mending the hurts of Uncle Sam's soldiers at the Strangest Mobile Army Surgical Hospital East of Detroit. You are the newest recruit to this mad, mad, almost front line unit.

Even in the short time you have been there, you have become accustomed to their way of life. To find that your little group has a fully functional alcoholic still was a ray of moonshine in your daily routine of boredom and bullet wounds. To now find it has disappeared is traumatic, and could lead to a serious malfunction in the system. Your task, should you accept it or not, is to track down the whereabouts of the still.

Smashed does not have a large number of locations and most may be explored as soon as you start the game. Written using Incentive's Graphic Adventure Creator, the graphics and the parser are quite acceptable without being in any way exceptional. The cassette inlay has a list of more than 100 words that are understood, so there is no excuse for getting stuck for a turn of phrase.

As with some other games from the same source, SEARCH has a slightly different meaning to EXAMINE and its regular use is to be recommended. Once you have mapped the terrain, you can start thinking of ways to approach the loss of the still. Talking to several of the characters is vital, and some means of persuading them to talk could prove useful.

Packed into less than 50 locations is a neat little adventure containing a great deal of fun. There are also a couple of mazes to test your mapping skills, but do not get too excited if you find that mapping is the main aim of that particular part of the game.

There are only about 20 objects to find, but everything has some purpose – you just have to find out how to get them and then what use to put them to. Switch on, sit back, and enjoy the Strangest Mobile Army Surgical Hospital East of Detroit.

RATINGS	Mindfighter	Smashed
Plot	67	60
Atmosphere	71	63
Addiction	59	62
Difficulty	71	58
Overall	66	63



Rom roundup

ROMBO ROM BOX

PROBABLY the best known rom board for the CPC, Rombo is a solidly built black box with a screwdown lid, two expansion ports and a foot long lead. This board holds eight roms, configurable by a simple DIP switch as roms 0-7 on the 464/664/6128, or roms 8-15 on the 6128. This latter configuration allows all eight sockets to be used, whereas normally slot 0 has to be left empty to accommodate Basic, and slot 7 has to be left empty to accommodate Amsdos.

6128 owners can also buy Rombo II (£29.95) enabling them to expand their systems to the full.

KDS ROM BOARD

THIS six-slotter can only be used as a first rom box to accommodate roms 1 to 6. As such it is the perfect board for 464/664 owners.

The board, which has a short lead and one through connector, is housed in a slim but sturdy plastic box with a screwdown lid, and can be easily removed from its housing to aid removal and reseating of roms. Brief instructions are included, plus a diagram detailing the slots and their numbers.

CAGE COMMS ROM

UNDOUBTEDLY the best viewdata (Prestel type) comms software around. Designed by Ian Hoare and written by Dave Gorski, two committed comms consumers, this rom was developed in response to users who didn't think the available CPC software was up to much.

The Cage system revolves around the carousel concept; a large number of pages can be copied from the host into an end-to-end linked file (the carousel) that can be saved to disc and later reloaded to view off-line, thus saving on the phone bill.

Many advanced features that are common in professional viewdata systems have been implemented in the Cage for the Information Provider and User alike. It supports all current telesoftware standards.

RODOS

HAILED as a real alternative to the Amsdos and CP/M disc operating systems, Rodos hasn't exactly set the CPC world on fire in its debut year. This is certainly due to the very bad manual that accompanies it, and the need to spend £10 more on Rodos Xtra if you want decent documentation.

If you are willing and able to take an appreciable amount of time getting to know Rodos, the advantages of its tree directory system and the power of its disc handling commands will become apparent, particularly when used in conjunction with 80-track drives. For the novice or part-time hobbyist though, the sheer power of Rodos might create more difficulties than it solves.

MICRO-MUSIC CREATOR

FEATURING a three-channel composer plus an impressive sound sampling program, First Byte's Micro-Music Creator is the first musical utility



Jeff Walker casts his eyes over what is available on rom for the CPC, and finds a wealth of exceptional software

available on rom. The versatile and user-friendly composer has room for 500 notes per channel and generates interrupt driven machine code music that can be easily switched on or off from within any Basic or machine code program. Truly music on tap.

The sound sampler – otherwise known as the digitiser – is again very simple to use and features powerful editing facilities.

MMC comes on two roms. The package includes a good manual plus a disc containing help files and a free game. At £24.95, Micro-Music Creator is one of the best value rom packages around.

PROTEXT

TO have a word processor instantly available at all times is one of the great pleasures of owning a computer. To have Protext instantly available at all times is one of the great pleasures of owning a CPC.

Protext is the fastest and most powerful word processor available for the CPC. But as daunting as a powerful system may seem, novices are still able to boot up and go – Protext is only complicated if you want it to be.

The great beauty of Protext is its ability to interact with many other programs. For instance, all the other Arnor roms may be called into service from Protext command mode.

With Prospell, Promerge, Utopia, BCPL and Maxam 1.5 in tow, Protext has the feel of a full-blooded operating system about it.

CP/M Plus

CP/M+ on rom is a much more attractive proposal than CP/M+ on disc; it's there, instantly, so you use it. Graduate has put a great deal of thought into these roms, turning a sometimes hostile environment into something that begins to approach user-friendliness.

Graduate's enhancements to CP/M+ include simple commands to change modes, pen, paper and border colours, plus the incorporation of Setkeys, Language, Set24x80 and Setlst as in-built commands. A definite must for the CP/M+ enthusiast.

PROSPELL

THIS program works independently of Protext by setting up two RSXs. **|SM** brings up the Spell Menu from where you can spell check a file, investigate a dictionary or create a new dictionary. Alternatively, **|SPELL,<fname>** will load in and spell check any Ascii file. Protext owners may spell check from command mode either the document currently in memory, or any other from disc.

Spell checking is very fast. Errors can be corrected and words looked up, added to or deleted from the dictionary with extraordinary ease. The 30,000 word dictionary comes on a separate disc, and it has to be said that although disc swaps are kept to the barest minimum, Prospell works best with twin drives.

PROMERGE PLUS

TO expand your business, automation and streamlining are the key words. Promerge Plus gives you that automation and streamlining, combined with power and great flexibility.

This program, which started life as nothing more exciting than a Mail Merge system, has extra commands for Protext – including one for creating multi-column documents – and features its own programming language.

To demonstrate the power of this language, Arnor have written and released an invoicing and



database system (Protext Office) written entirely in Promerge Plus "stored commands".

The Promerge manual gives comprehensive details of every stored command and features many examples of how to "program" the system. As with all powerful programs, it can be hard going at first. But with Protext on rom, a little thought and some application, Promerge Plus could be just the thing you need to take your small rush-around business into the big time.

UTOPIA

A UTILITIES rom, Utopia logs on 50 useful RSXs, some of which – like the disc sector editor – are mini programs in their own right.

Some Utopia commands have become famous. ı**GDUMP** is one of them – a 27 shade graphics screen dump. But famous or not, all Utopia commands are renowned for their user-friendliness because of the way they prompt you for parameters and filenames instead of beeping and swearing at you.

A genuinely useful set of utilities that will not only enhance the performance of your computer, but may also help you to learn a more about it.

MAXAM

THIS is the original Maxam adopted some time ago by ACU as *the* machine code assembler for Arnold. It comes with a full screen text editor that is better than some word processors, and the whole thing is driven from two simple menus.

Menu One contains the Monitor options. From here you can list or disassemble memory to screen or printer, page in roms (including the lower Basic rom), edit, search or compare memory, and relocate a block of machine code.

Menu Two contains the Text options from where you can enter your program, assemble it, call it and debug it.

Although some rival assemblers can claim more features, few can compare with the speed and flexibility of Maxam.

MAXAM 1.5

MAXAM 1.5 was designed to be used from within Protext. With these two roms fitted you have both a word processor and an assembler at your fingertips.

After entering your machine code into Protext, typing ASM in command mode assembles it. Typing DI disassembles it and DIF does the same thing to file. Many new features and directives have been added to those available in the original Maxam, including enhanced break points and other debugging facilities. If you already own Protext and own a rom box, this is most definitely the assembler to buy.

Product	Price £	Comments
Rombo rom board *Rombo Productions*	34.95	The long lead can cause boot-up problems. 2nd Rombo available at £29.95. ZIF unit and 16K static ram available. Good manual.
KDS rom board *KDS Electronics*	24.95	Only 6-way so cannot be used on 6128 for roms 8 to 15. Perfect for the 464. Very brief, but adequate, instruction sheet.
Protext *Arnor Ltd*	39.95	Versatile and very powerful. Excellent manual. Integrates well with every other Arnor rom.
Prospell *Arnor Ltd*	34.95	Fast and simple to use. Works best from within Protext, but will spell check any Ascii file.
Promerge Plus *Arnor Ltd*	34.95	Has it's own programming language. Many other uses apart from mail merging. Good manual. Needs Protext on rom.
Maxam 1.5 *Arnor Ltd*	29.95	Fast assembler. Adequate monitor, break points, but no single stepping. Good manual. Works best in conjunction with Protext. Extra commands and directives.
Maxam *Arnor Ltd*	39.95	Same as above but with a full text editor in place of the extra commands and directives. Stand alone program, but integrates well with Protext.
BCPL *Arnor Ltd*	29.95	Ancient language, poorly supported. Compiles to fast relocatable Z80 machine code. Adequate manual.
Utopia *Arnor Ltd*	29.95	Impressive variety of powerful and useful commands. Good manual. It becomes indispensable. Very user-friendly.
Cage Comms Rom *Ian Hoare*	31.95	Best CPC viewdata software around. Not suitable for scrolling boards and micro/mainframe links. Excellent manual and support.
Micro-Music Creator *First Byte*	24.95	Two roms. Good manual. Music and sounds can be easily incorporated into your own programs.
Rodos *Romantic Robot*	29.88	Steals a very large chunk of ram. Powerful, but some commands clash awkwardly with Utopia. Bad manual.
CP/M Plus *Graduate Software*	24.95	Two roms. Must send your original CP/M+ master disc with your order. The CP/M user's dream returns.

BCPL

OF all the many languages written for computers, BCPL is one of the least popular – mainly because it was quickly superseded by the C programming language.

Having said that, Arnor's BCPL is still a fine integer-only programming language that is perfect for writing games and utilities that need a little more speed. A comprehensive disc-based library of functions is provided – including a special one that contains all the CPC graphics routines. Also provided is the BCPL source code for a mini word processor and a space invaders game.

Protext itself was partly developed in BCPL. What further recommendation could you want?

SUPPLIERS

Rombo Productions, 107 Raeburn Rigg, Livingston EH54 8PH. Tel: 0506 39046

KDS Electronics, 15 Hill Street, Hunstanton PE36 5BS. Tel: 04853 2076

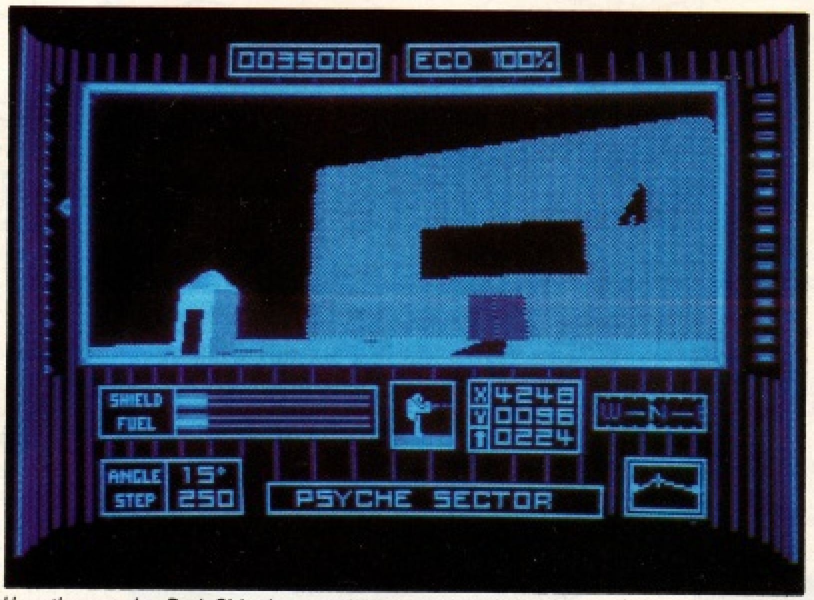
Arnor Ltd, 1 Wainman Road, Peterborough PE2 0BU. Tel: 0733 239011

Ian Hoare, 46 Connaught Road, London NW10 9AG. Tel: 01-965 8957

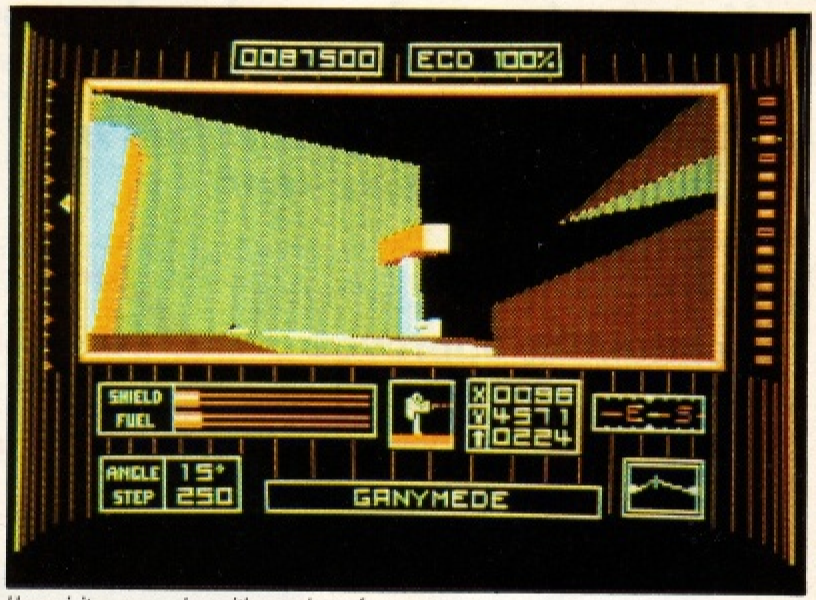
First Byte Software, PO Box 50, Yeovil BA20 1XS. Tel: 0935 851265

Romantic Robot, 15 Hayland Close, London NW9 0LH. Tel: 01-200 8870

Graduate Software, 19 Everest Road, Bristol BS12 2BX. Tel: 0272 656659



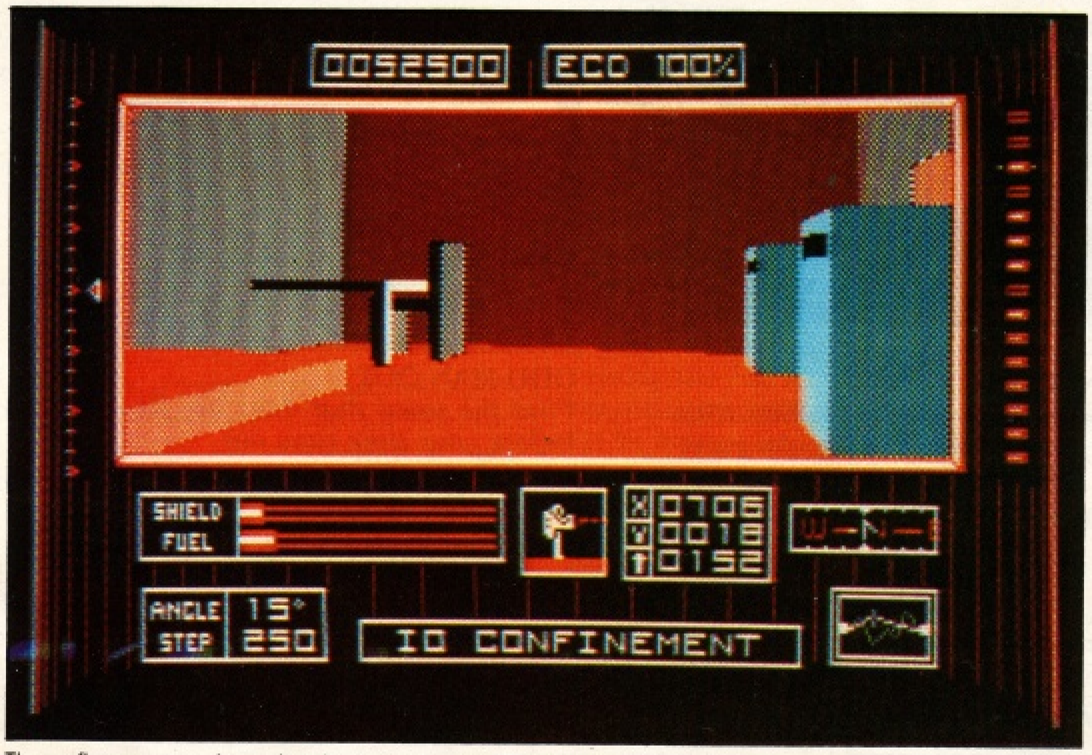
Here the massive Dark Side doors and illuminated sign dominate the scene



Here visitors can relax with a variety of amusements

Walk on the DARK SIDE

If you are in the mood for a busman's holiday this coming winter you need look no further than Tricuspid for the trip of a lifetime, as Pat Winstanley found out



The confinement area demands a demonstration of shooting skills before leaving

ALTHOUGH still in the final stages of construction when this guide was researched, this moon of Evath promises an exciting tour of the very latest technology combined with true local colour and hospitality.

Tricuspid, with its combination of ancient and modern, is typical of Ketar culture. Classical Triton and bustling Formalhaut provide a fascinating contrast, pure flamboyance merging effortlessly with contemporary practicality.

However, travellers should note the strict laws of this moon where ignorance is unacceptable as a defence. Summary justice is the order of the day – punishment consisting of solitary confinement, public flogging or transportation – so travellers are advised to acquaint themselves thoroughly with local bye-laws at the first opportunity.

Transport

Jet packs are essential for movement in several areas and are also highly recommended for panoramic sightseeing. Fuel rods and wall shields are available in Sirius, Thethys, lapetus, Regulus and Nereicl. Also readily available are switching units where energy forms may be translocated.

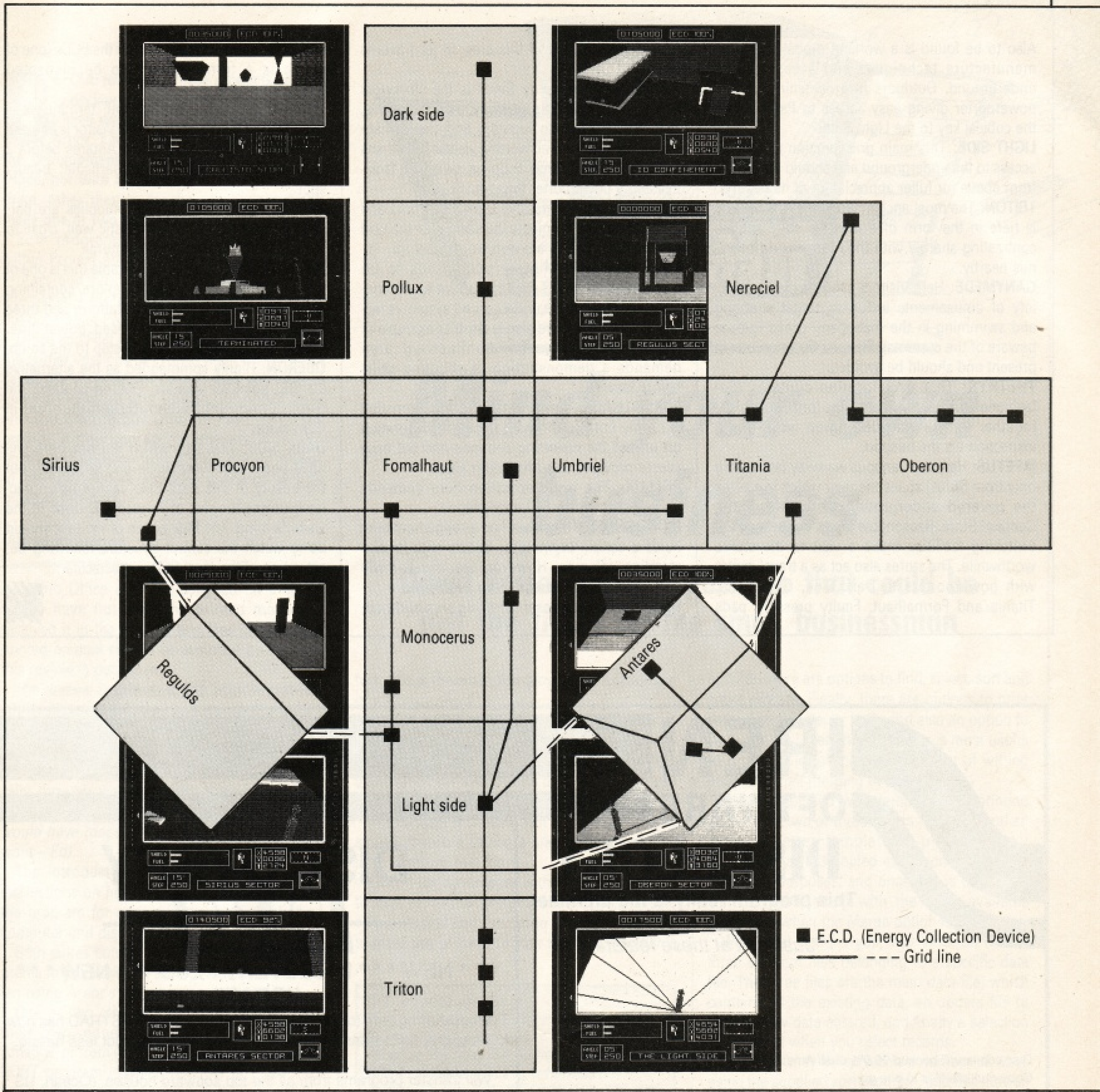
> ***WARNING – Jet packs do not have the standard "hover" cut-out, so they should not be de-activated until the user is on a solid surface.***

For rapid general travel, powerporters in Regulus, lapetus and Sirius are highly recommended, while access to restricted areas is available by telepod. (At the time of writing the telepod was not yet in service, but crystal manufacture was almost complete in the Equator Tunnel, lapetus and Thethys. Our representative also heard rumours of convict labour but is unable to confirm such speculation.)

The underground tunnel system, while providing rapid travel, is not currently recommended for anything but commuting. Although both the Ganymede and Callisto Storemasters assured our representative that changes were underway, we do not anticipate completion of conversion operations before the start of the season. However, travellers in later months might find the system of more interest.

Attractions

Tricuspid visitors are fortunate in being able to examine at first hand the most spectacular power grid in the known universe. Three-quarters of the moon is criss-crossed by decorative representations of the underground lines, while monumental Energy Collecting Devices (ECDs) reach towards Evath's sun, their operational status con-



firmed by ornate flares at the apex of each.

Panoramic viewing of the representations is highly recommended for full appreciation of the design and interaction of the grid. (A general summary of the grid lines is given in Figure I). Other attractions include the Sphinx in Triton, the forests of Regulus and the covered walkway in Iapetus (accessed from Sirius).

Local customs

As stated earlier, visitors are well advised to acquaint themselves with local standards of behaviour as some areas indicate a distinct hostility to strangers.

In addition, the Tricuspid Military Force maintains a constant surveillance, on-the-spot sentences being standard practice. Unfortunately surveillance is from a highly elevated position so transgressions are often imagined. The Tricuspid Touring Company suggest either concealment or direct confrontation for visitors having difficulty with airborne arrest.

Where to go

REGULUS: This wooded area is the ideal starting point for any tour. Visitors should explore both sections of the store for fuel and shield supplies.

Suggested grid line tours.

1. Light Side – Triton
2. Light Side – Antares
3. Light Side – Monocerus
4. Light Side – Formalhaut
5. Light Side – Antares
6. Light Side – Sirius – Formalhaut
7. Light Side – Monocerus – Formalhaut
8. Formalhaut – Sirius
9. Formalhaut – Umbria
10. Formalhaut – Pollux – Dark Side
11. Formalhaut – Umbria – Titania – Nereicl – Titania – Oberon
12. Antares – Titania

Figure I

Also to be found is a working model of crystal manufacture techniques and access to the underground. Outdoors is a switching unit, a powerporter giving easy access to Psyche, and the cubical key to the Light Side.

LIGHT SIDE: This main grid junction also gives access to the underground and should be viewed from above for fuller appreciation of its beauty.

TRITON: The most ancient wonder of the system is here in the form of a massive solid sphinx, contrasting sharply with the modern grid terminus nearby.

GANYMEDE: Here visitors can relax with a variety of amusements including target shooting and swimming in the mahogany ocean (please beware of the currents). The pier is dangerous at present and should be avoided.

THETHYS: This dark location contains old-fashioned fuel and crystal stores (prices are high) together with a wall decoration worth close inspection via the telepod.

IAPETUS: Here the Canopus walkway (accessible only from Sirius) spans the river which separates the covered underground station from the Centauri Store. Reasonable prices for fuel and full switching facilities make a visit to the stores worthwhile. The stores also act as a travel centre with powerporters to Dark Side, Ganymede, Titania and Formalhaut. Faulty pressure pads have been reported in this area so jet travel is advised.

SIRIUS: Sited in sunny Sirius is the clockwork access to the Canopus walkway, a grid terminus, high level access to Iapetus, and the Callisto store. The store is well worth a visit as it contains part of the crystal forge, supplies, switching facilities and a powerporter to Iapetus.

PSYCHE: Here the massive Dark Side doors and illuminated sign dominate the scene, but the wall carving and telepod are well worth visiting.

PROCYON: The Military post needs to be acknowledged in this area but a visit to the confinement block in the underground system is recommended first. Here also is another example of crystal technology. The confinement area demands a demonstration of shooting skills before leaving.

FORMALHAUT: This grid terminus and junction is chiefly notable for the flamboyant decoration on one of the collecting columns and the easy access provided to surrounding areas.

POLLUX: The wall decoration here demands close inspection for full appreciation.

MONOCERUS: The power line arrangement here holds a certain asymmetric beauty with its two standing columns. However, the traveller will find little else of interest in the darkness.

UMBRIA: Military posts scan this area and both should be acknowledged early if the ECDs (one of which is a terminus) are to be inspected peacefully.

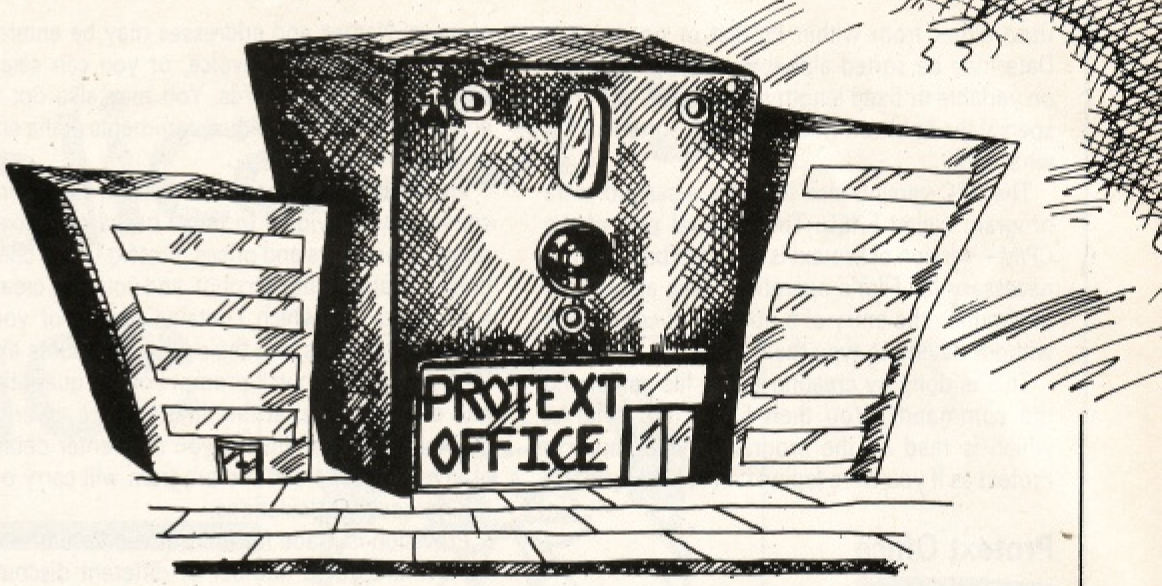
TITANIA: This area acts as both terminus and relay station for the grid, but the visitor is advised to inspect Oberon, Nereicl and Antares before a detailed examination of this particular beauty spot.

NEREICL: Both ECD and fuel supplies are partially concealed behind a majestic wall, close to the site of the area's touching mural.

ANTARES: After Oberon and Titania this is one of the most interesting areas to explore, containing as it does a gigantic hanging platform and three ECDs interlinked by an exposed power line. Access to the platform is via a step to the south.

OBERON: Highly commended as the alternative starting point for tourists, Oberon contains the principal grid terminus and access to the ocean in Ganymede.

DARK SIDE: Any tour which finishes here will have been both worthwhile and profitable, but the beauty of The Dark Side cannot be appreciated unless the rest of Tricuspid is fresh in the visitor's mind. The final action of the tour should be to watch the central structure following deactivation of the local ECD – spectacular.



Mind your own business

David Foster views a package that could be just the ticket for the small businessman

BEFORE reviewing these products I ought to declare my interest in the them. While I have written a number of manuals for Arnor, I have not been connected with the development of Protext Filer and Protext Office, nor with the writing of the manuals for them, other than to try the programs out and make one or two suggestions.

Both programs are intended for use from within Protext and require you to have at least Protext and Promerge (or Promerge Plus), or alternatively the full version of CP/M+ Protext, but not Pocket Protext.

Office and Filer will not work with one or two of the earlier versions of Protext and Promerge – a list of the versions with which they will work is given in Figure I. If your version isn't one of these and you want to buy Office or Filer, Arnor will provide a free upgrade on request. It is also possible to upgrade from CP/M+ Pocket Protext to the full version, although a charge will be made in this case.

What you get

Filer and Office are each supplied on a single disc. I have not seen the printed manual; I received it in the form of text files on disc. The printed manual should be available by the time this review is published.

The manual is extensive and includes tutorials which guide you through a typical session before progressing to detailed descriptions of each part of the programs. There is no index, but this is not really a problem as the manual progresses logically through the programs' menus, making it quite easy to find what you want. *(An index would have made it very easy to find what you want – Ed).*

The introductory chapter provides detailed instructions on how to create working copies of the program for each different configuration of computer and disc drives.

Both suites consist of a number of small programs, many of which are Protext text files written using Arnor's stored-command language.

One or two other programs may be used on their own, either from within Protext, from Amsdos, or from CP/M+. They include a powerful SORT program – which has lots of other uses apart from with Filer – and in the case of the Amsdos version, an EXEC program which is described later in this review.

Protext Filer

Filer is not a full blown database, and is not intended as such, though for many people with relatively simple database requirements it will do all that they require with ease.

The concept behind Filer is that it provides a means to easily maintain and create lists of data in a constant form. The lists can be used for a variety of purposes, but in particular as a part of mail merging or a means of retrieving names, addresses and the like for letters and documents. It can be customised to handle all sorts of data. In fact, one of the examples provided is a catalogue of a music collection.

You may enter data, file it and then use it directly for your mail merging or address labelling, or you may create further data files containing only selected data. You may also use it to recall data directly into a document.

The concept is unusual as it is a sort of half-way stage between a database and just typing things in as a normal text file.

One of the advantages is that you do not need to learn all the mail merging commands available within Protext and Promerge in order to be able to make use of many of their facilities. Another is that because all the data is stored in the form of normal text files, you can load them into Protext as such for editing or viewing.

> ***CPC Amsdos version***
> *Protext (disc or rom) 1.00 upwards*
> *Promerge (disc) 1.02 upwards*
> *Promerge Plus (rom) 1.02 upwards*
> ***CP/M+ Protext (not Pocket Protext)***
> *Version numbers 2.04, 2.05, 2.06, 2.07, 2.08, 2.09, 2.12, 2.17, 2.18, 2.19 and 2.21 upwards.*

Figure I: Versions of Protext and Promerge with which Office and Filer are compatible

You start using Filer by loading Protext and typing EXEC FM from command mode. (On the CPC version you must first run the EXEC.BAS program to install the EXEC RSX). This produces a menu from which you select by entering the required option letter.

Housekeeping options are provided to initialise new datafiles, list and edit the current datafile specifications and change the current datafile. In addition there are options to find, select, sort and count records. Finally, there are options to print data, display data, or both, and also an option to carry out mail merging. The latter is most useful as it takes a lot of the hard work out of writing your own mail merging template files.

Filer is provided with templates for printing labels, one, two or three across the page, and an example letter template is provided. Any template may be copied and modified to suit your own purposes, and once this is done they will be listed, along with the other available templates, when the Merge option is selected.

With most options you may work on any of three different files belonging to a specific data file. The three files are the main data file, which contains all the existing data, an update file to contain new data entered, and finally a selection file, created when you select records.

Data files may be sorted in a number of ways using the supplied sort program, and this may all be set up in Filer so that it sorts in exactly the way you require.

Filer can take most of the hard work out of maintaining data in an organised fashion and also provides the facility to merge data into text files painlessly. It has to be said that it is not lightning fast on the CPC, but what it lacks in speed it more than makes up for in ease of use.

Extra programs

FSORT is an extremely powerful general purpose sorting program that allows you to sort many types of data file in a number of ways. It may be

used either from within Protext or on its own. Data may be sorted alphabetically, numerically, on variable or fixed length records, and you may specify the fields on which they are sorted and in what order.

The CPC version also includes a second extra program called EXEC. This integral part of the CP/M+ version of Protext is included because it is necessary for Filer's operation. Exec allows you to simulate the entry of a number of commands without having to type them in.

This is done by creating a text file containing the commands. You then EXEC this datafile, which is read by the program and is input to Protext as if you were typing it in at the keyboard.

Protext Office

Office includes the Filer programs described above and also provides an invoice generating system consisting of a number of special Protext text files.

Facilities are provided to configure the invoicing system to suit your needs. You can specify the invoice's layout and whether your company name and address is to be printed. The positioning of addresses, dates, and any other information may all be specified from within the program by answering a series of questions.

The invoicer program may be used in a number of ways. Names and addresses may be entered when you create an invoice, or you can select them from Filer's records. You may also opt to enter standard or individual comments at the end of each invoice.

Invoices can take many forms, from each being completely individual to those based on a fixed range of products and prices. Protext Office takes these variations into account, and you may create a products file which contains details of your range of products and their price, discounts and VAT. The program will prompt you for quantities and discount level at the time you are entering the invoice. Alternatively, you may enter details at invoicing time and the program will carry out the necessary calculations.

Provision is made for up to five different rates of VAT and for a number of different discount structures. Prices may be calculated on either an inclusive or exclusive of VAT basis, and provision is made for carriage to be charged.

When entries are complete, you may either print the invoice immediately or display it on the screen. In both cases a file is created on disc containing the full invoice. This may be printed at any time. A file containing a summary of invoices may be scanned at leisure. The facility is also provided to create statements.

Protext Office is comprehensive and the aim has been to produce something flexible that can be configured to suit a range of different needs. Such things as the option to specify a default date for all invoices, or for invoice numbers to be automatically generated, are useful touches and remove a lot of the frustrations often encountered.

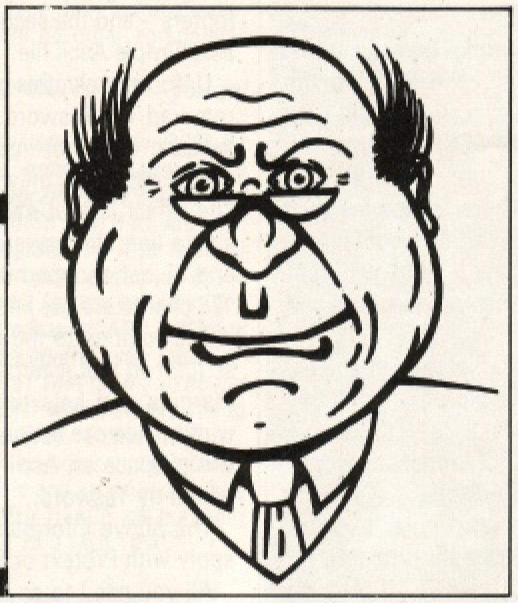
Conclusions

Both programs are apparently well tried, Arnor having used them for their own mailing lists and invoicing for some considerable time. They are certainly extremely easy to use as you are prompted at all stages for valid entries. In many cases default values are offered.

As the programs consist of Protext text merge files, anyone who has any really odd requirements and is competent at programming should have little trouble in modifying the source code themselves to make them even more flexible.

Protext Filer £24.95 (CPC/CPM+ disc)
Protext Office £34.95 (CPC/CPM+ disc)
For use with:
CPC Protext £26.95 disc, £39.95 (rom).
CPC Promerge £24.95 disc
CPC Promerge Plus £34.95 rom
CP/M+ Protext £59.95 disc
From: Arnor Ltd, Protext House, Wainman Road, Peterborough PE2 0BU. Tel: 0733 239011

Applications advice



From initial power up problems to logos in letters, David Foster is the guy to rely on for a helpful reply

DOESN'T time fly? I just checked – this is the twelfth time I have written this column, and the problems keep rolling in. It appears that at last many people are beginning to appreciate that the CPC they bought some time ago has actually got a use other than for zapping aliens. Yes, with suitable software it makes a very competent small business computer, not to mention being ideal for more serious use.

Perhaps one of the reasons for this increase in serious use is that the price of printers has dropped substantially over the last couple of years, bringing them within the reach of many more people. A printer really ought to be one of the first items of extra equipment bought. Without a printer, there is little that you can do with most business software. I mean, there isn't a lot of point in writing letters if you can't print them out.

Micronet comms pack



Oh well. You can't win every time, I suppose. Within a week of sending off copy for the last column, two things happened which made my advice to M.Barnard about Terminal software for use with the Micronet Comms Pack somewhat out of date.

Within two days Dave Gorski, one of the people concerned with the production of the Cage comms rom, had come up with an overlay patch for the Mex Terminal comms program that enables it to be used with the Spectre Interface supplied as part of the Micronet pack. This is now available on the Amster's Cage database on Prestel.

In fact, a section of the Cage is now devoted to Mex and the many customising overlays that are available for it, together with a lot of useful information about the program. Well worth a look if you are a subscriber to Micronet.

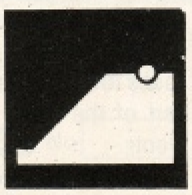
At the end of the same week, Spectre Communications announced on Amster's Cage that a company has now produced a patch to enable their interface to be used with CP/M. Details of where this can be obtained are available from Spectre.

All is not quite rosy though, because for some unknown reason the patch is for CP/M 2.2 rather than the more commonly used CP/M Plus. I gather that if the company receives enough enquiries, it may be persuaded to produce a patch for CP/M Plus.

So anyone who has bought the Micronet Comms Pack can now use Mex to access bulletin boards, and in addition – as long as they are using CP/M 2.2 – they can also now use the interface with other items of equipment, such as a serial interface printer.

The whole situation is rather silly though and could have been avoided if Spectre had followed the specifications laid down by Amstrad for the RS232 interface. The recommended specification works with both versions of CP/M and Amsdos.

Running Microword



D.O.Hagan of Warrington was provided with a copy of Microword when he bought his CPC6128 but is unable to get it to run.

I haven't really got enough information, but Microword was marketed under the Amsoft label in a dual format that was configurable for use with either the CPC or the PCW. It is necessary to run a program on the disc called MAKEDISC, and that will create a working copy of Microword suitably configured for use on the appropriate machine.

Saxon, the author of the program, assures me that unless this program is run first Microword will not work because some program changes are made in the process. They also tell me that while they provide support for the PCW version which they market themselves, support for the Amsoft version is provided by Amstrad.

Locoscript II to Arnold



Mr Falconer's reason for writing is that he uses Locoscript II on a PCW and is having trouble reading and using Locoscript files on the CPC with Tasword. I won't comment on the fact that if he used Protext on both machines he would find that text files were interchangeable, as I might be accused of being biased.

There are two problems with trying to do what Mr Falconer wants. Firstly, PCW formatted discs are not readable by the CPC, and secondly, the Locoscript Ascii save option is slightly unusual. The answer to the problem of reading PCW format discs is further complicated by the appearance of the 9512 which only has a single, double-sided, disc drive.

On the 8256 and 8512, drive A: is a similar drive to the CPC one and is quite happy to read CPC data format discs, so the easiest way to transfer files to the CPC is to data format a disc on the CPC and then use PIP on the PCW to copy the required

CLINIC

files on to it. It may then be used on the CPC as normal.

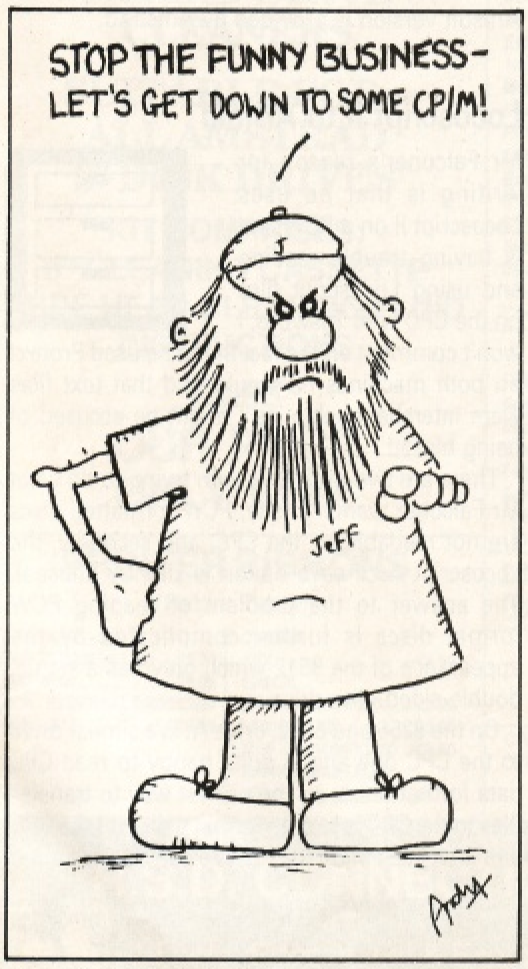
The reverse process also works. In many cases, it is not even necessary to copy the files on to the data format disc as the disc may be used with many CP/M programs on the PCW as an alternative to a PCW format disc – but not as a Locoscript disc unfortunately. There is also a Public Domain program called PCW.COM – sometimes named FORM3.COM I believe – that will configure a CPC drive so that it can read single sided PCW discs under CP/M.

On the 9512 it is not so simple, though at least one company claims to have a program that will enable 9512 users to format discs in its double sided drive as standard CPC format discs and also to transfer files to these discs.

One that has received particularly good reviews is the PCW9512 Rescue Kit produced by Three Inch Software (Tel: 01-546 2754). Among other things, this piece of software will allow a 9512 to format 40 track discs that are usable on the PCWs, CPCs and Spectrum Plus 3 machines. It costs just £9.95.

The real problem that Mr Falconer is having is that once he has transferred the files across to the CPC, they will not load into Tasword. Locoscript files are in a very complex format and before they may be used, they must be saved using one of the two Locoscript II Ascii save options.

One of these options saves the file in a "page layout" form – complete with spaces for the left margin, page break gaps and any headers and footers – and the second option that saves them as a simple Ascii file.



Unfortunately, this option does not do what is required for Tasword because when the file is saved it does not insert carriage returns at the end of each line, only at the end of a paragraph. The effect is that each paragraph is seen as a single line by Tasword and if it is too long, the end is just chopped off. Tasword has a limit of 128 characters per line.

The solution to the problem is to set up Locoscript II so that it zeros the side, top, and bottom margins and sets the document to a suitable width. Then use the page layout save option. This will produce an Ascii file that may be read and edited by Tasword.

The above information, incidentally, does not apply with Protext or BrunWord.

All you need to do with Protext is save the file as a simple Ascii file from Locoscript II, load it into Protext and type FORMAT to re-format the document to the required width.

Brunword will automatically format the text to the default 80 column width upon loading – use the ESC-A sequence to load Ascii files – after which it's just a case of CTRL-L and CTRL-R to adjust the margins to that which you require.

Tasword and logos in letters

J. Rankin of Liverpool wants to print his company logo on the top of his invoices and letters from within Tasword. He has purchased light pens, Tas-Sign and all sorts, but still hasn't had any success. The simple answer is that it can't be done. Actually, this isn't quite true, although it is perhaps debatable whether it is worth the effort.

When printing from Tasword, you can only print any characters that the printer is capable of printing. It is not possible to go into full graphics mode, print part of a document in graphics and then continue in text mode. It is, however, possible to re-define certain of the characters in the DMP2000, to produce parts of the logo he requires.

I have described the procedure for re-defining characters in a couple of previous columns, so shall not repeat the process, but what he needs to do is break the logo down into suitably sized squares, work out the values required to re-define a number of characters, then send those codes to the printer. This could even be done as a part of the Basic Loader, using PRINT#8 statements.

He will then need to insert the appropriate characters into the document in the correct locations, so that when printed, the re-defined characters appear, giving the required logo.

Brainstorm solution reprise

Stuart Falconer from Newcastle upon Tyne says the procedure I gave in the May issue about how to re-configure Brainstorm to suit different size pages worked a treat – except for the fact that I neglected to mention that you must save the modified file before leaving SID, by typing:

```
WNEWBRAIN.COM
```

and pressing Return. The W before NEWBRAIN-.COM – which is SID's save command – went walkies somewhere along the wire between here, Telecom Gold and Brentwood.

Anyway, I am pleased to hear it worked. I gather from David Tebbutt of Brainstorm Software that an updated version of Brainstorm is available and now includes a configuration program.

Rom boards

A. Lumsden writes from a forces BFPO number concerning my recent comments about connecting the DDI-1 interface as close as possible to the 464. He wonders whether I have ever tried connecting a ram expansion unit to the Rombo rom box, as it required minor surgery to achieve it. I have and he is right that it did require surgery. I had forgotten, as I had opened up the slot in the Rombo casing to make room for the expansion ram connector some time previously.

The problem that Mr Lumsden is having is that he keeps getting a Protext Checksum Error message when he switches on. This is one of the symptoms you can get when a bad connection is made on one of the connectors, but I have also seen it when the 464 is having difficulty supplying enough power to run all the accessories.

As he says he is using the Rodos rom in addition to Protext, Prospell, Promerge Plus, Utopia and the BCPL roms along with the ram expansion unit, I suspect that the power supply may be the problem.

I think the best thing to do would be to check that all the connectors are very clean – use a pencil rubber on them – and if the problem is still there, try removing roms one at a time until the problem disappears. If it is simply a matter of an overload, the problem ought to disappear once one or two roms have been removed. It doesn't solve the problem, but at least you will know the cause.

ROMANTIC ROBOT *present*

1988 – THE YEAR OF THE ROBOT

RESET ● multiface two ● STOP

If you wish to be able to STOP any program at any time and COPY it to disk or tape, fully automatically, at a touch of a button, then MULTIFACE 2+ is the ONLY answer. There are no other comparable hardware devices, and the software copiers simply cannot compete.
Firstly you cannot compare the SUCCESS ratio of any tape copier with the MULTIFACE – you get what you pay for (and we throw in a lot more with the MULTIFACE . . .).
TAPE COPIERS always need to be loaded first, whilst MULTIFACE has all software in ROM for instant use. TAPE COPIERS can only attempt to copy a program as it stands, before it loads – there are various protections in the way and not enough memory for both the program to be copied and the copier. MULTIFACE is different: you can load any program from TAPE or DISK, run it as you wish and activate the MULTIFACE whenever you need it. Once you SAVE a program, be it to DISK or TAPE, you can CONTINUE it, SAVE it again if you wish, etc. In fact, you can play games as never before: there is no need to start from the beginning each time you play a game (as you would with a tape copier – if it could copy in the first place . . .). Since you can SAVE a program at ANY TIME and continue it, you can actually SAVE as you progress through a game. If, eventually, you loose all your lives, you can just load the latest saved version and continue from there! That is, if you do not manage to get INFINITE LIVES to start with: MULTIFACE has a built-in TOOLKIT which allows you to STUDY and ALTER anything in any program; you can thus POKE in infinite lives, ammo, etc.
MULTIFACE is extremely simple to use, friendly, idiot-proof, menu-driven with on-screen instructions, fully automatic – PURE MAGIC. It can be used on any CPC, comes with a cable and an extension bus for £47.95 ONLY! By the time you buy 10 programs on tape instead of disk – MULTIFACE will put them on disk for you – you will have saved some £50 which is more than the cost of a MULTIFACE. The money you save on further tapes is all yours!

MULTIFACE – WORTH EVERY PENNY, SAVES YOU POUNDS!

NOW AVAILABLE: MULTIFACE 2 PLUS – THE INVISIBLE ONE.

Tape-to-disk at the touch of a button. Ridiculous, you may say, but it works every time. *Multiface* can stop any program in its tracks and save the program from memory to either tape or disk. It's completely foolproof. Similar products have had problems with screen size, colour and even sound; *Multiface* can handle all these without a second thought.

That alone would have satisfied many people, but Romantic Robot has gone one step further, incorporating a memory editor. No program is safe with this: everything is out in the open, including the Z80 registers, CRTC data and any part of memory.

Don't be fooled into thinking this will result in mass piracy, however. The *Multiface* unit itself must be plugged into your Amstrad to allow reloading of a program it saved.

Multiface II must be the cleverest hardware device at present – a necessity for disk owners who thought they were stuck with loading from tape every time.

AMSTRAD ACTION JANUARY 1987

WOULD YOU LIKE TO TURN YOUR CPC INTO A PROFESSIONAL SET-UP?

Would you like to be able to attach additional disk drives – 40/80 track, single/double sided, 5.25 or 3.5 or 3 inch – and store up to 800K per disk? All controlled by a powerful DOS? Have RANDOM ACCESS to your files? Get a PRINTER BUFFER and SILICON DISK and a ROM manager and over 50 new bar commands! All this on a single ROM:

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Now also available: RODOS EXTRA on disk for only £9.95. Any RODOS owner will find RODOS EXTRA indispensable: it offers nearly 200K of valuable information how to get the most out of RODOS, with examples of RODOS applications ranging from simple to complex such as a DISK DOCTOR or IBM MSDOS DISK READER. The indispensable EXTRA!

TOP SECRET

BUT NOT FOR THE **INSIDER**

NO PROGRAM IS SAFE ONCE THE INSIDER GETS IN!

JUST INSTALL INSIDER INTO MULTIFACE, RUN ANY PROGRAM, STOP IT AT ANY MOMENT AND INSIDER REVEALS EVERYTHING: IT WILL FULLY DISASSEMBLE, FIND TEXT OR CODE, VIEW/ALTER MEMORY AND Z80 REGISTERS, DUMP TO PRINTER – ALL THIS ON DISK FOR **ONLY £14·95**

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SOLID GOLD FOR HACKERS.



RODOS requires a ROMBOARD. RODOS EXTRA needs RODOS. INSIDER needs MULTIFACE 2.

THE YEAR OF THE ROBOT · BE PART OF IT

I Order:					
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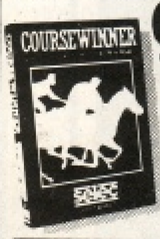
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STAR TROOPER

ONCE again, Jabba McGut, leader of the evil Alien Syndicate has evaded the clutches of the Star Trooper Marine Corps. He has left behind, hidden in his secret HQ complex, the sole supply of five new super-alloys, stolen from Earth during a recent raid.

The ingots, together with other useful items of equipment, have been thrown into the base's incinerators and are further protected by robots controlled by the automated defence system. You have been selected to retrieve the ingots.

You will need to defend yourself against the robots. To assist in this and to aid your search you will need to collect lift passes, teleport access cards and force-field protection shields, all of which have also been thrown into the incinerators. Unfortunately, some of the incinerators have been booby-trapped – there is one simple but fatal way to find out which.

As with all good games, frustration and addiction go hand in hand. Star Trooper is not a game to while away the odd few moments before an urgent appointment: It maintains the high standard of playability and presentation that Players have achieved with Metal Army. The excellent graphics, vibrant sound effects and high level of action are all there. Unfortunately, so is the game content. Star Trooper is Metal Army with spacesuits.

It would be unfair to be overcritical. At the price, both games are excellent value and one or other of them would be a good addition to anyone's collection. If you've not already bought Metal Army, buy Star Trooper – it's top value entertainment at a budget price.

Author: Robert Lever for Players
Price: £1.99 tape



Liz

I ALWAYS ask myself who a game is intended for when attempting an assessment – too many games these days seem to be aimed at whizz kids with an IQ of 180 and the manual dexterity of a concert pianist. Good value they may be, but their range is rather limited.

Star Trooper is capable of being played by anyone from four to 94 yet it does not compromise on quality. At a budget price it represents one of the better "fun" games I've played.

16/20

LAZER TAG

ONE of the strangest imports from the USA has been the sinister pastime of groups of well-off people travelling to a remote area of the countryside, dividing themselves into teams and behaving in a military fashion by plotting against and shooting at their opponents with blobs of paint fired from pressurised aerosol guns.

According to its proponents, this absurd behaviour is the ideal way to escape from the rigours of business life.

Well, Go! don't think it's silly, because Lazer Tag is a variation on this theme – the clock has been moved forward to 3010 AD and the paint guns have been replaced by the ubiquitous laser.

You are placed in the middle of a vertically scrolling landscape and are attacked from all sides by "your fellow playmates". They try and shoot you; you try and shoot them.

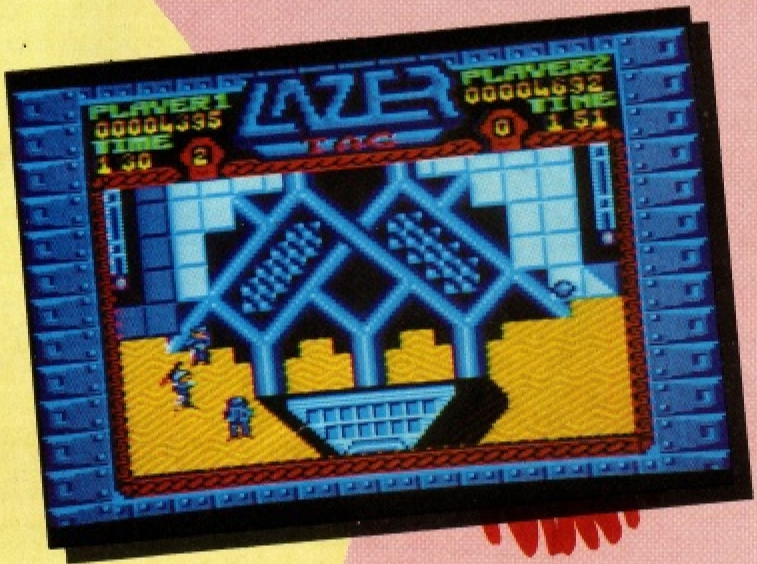
If you are shot you lose one of your six lives; if one of your friends is shot there is a loud pinging noise, he puts his hands up in the air and disappears, your score increases, and another friend materialises out of thin air ready for you to take pot shots at.

There are other things to shoot at – deflector shields and other devices, when hit, turn one shot into four. Running over equipment gives you extra time or lives.

Once you have reached the end of the bonus level you get yet more points and go on to the next level in which your friends are better shots and more trigger happy.

This sequence of events continues ad nauseum until you run out of time, are shot six times, or drop dead of old age.

Author: Worlds of Wonder Inc. for Go!
Price: £9.95 tape, £14.95 disc



Colin

THIS plays like the battle sequence in Beach Head – the one where your ship has to manoeuvre its way through a minefield while having strange linear missiles fired at it. The graphics are different, but the idea's the same.

Despite all the blurb about good clean fun and fellow playmates on the inlay, this game is still about shooting *humans*. Many people are concerned about the morality of such programs.

Lazer Tag should be consigned to the Chamber of Horrors along with fruit machine simulators and similar stuff. Liked the music, though.

15/20

DESOLATOR

DESOLATOR is the name that has been given to the micro conversion of the coin-op hit, Halls of Kairos.

Kairos is the Great Satan and the Halls are his pad. On their walls hang mirrors, trapped behind which are infants – known in the game as Peters – and your job is to guide Mac (Our Hero) around the halls releasing as many Peters as possible.

There are White Peters, Green Peters, Red Peters and ... yes, you guessed correct ... there are Blue Peters too. Catching the variously pigmented Peters results in various bonuses being awarded.

The ultimate aim of the game is to catch the Red Peter and thus turn into the invincible Machoman.

The instructions are a little vague as to what one does once one has become invincible. One would have thought being invincible sort of takes the challenge away, but then Desolator isn't too difficult a challenge anyway.

Success depends more on brawn than brain. Millions ... well OK, hundreds ... of little blue guards march through the halls. Contact with them rapidly drains your energy, so they have to be dodged or persuaded to go away with a well aimed left hook.

If you do get sapped, healthy living can be restored by punching jars that conceal slabs of extra energy.

Authors: Source for US Gold/ Sega
Price: £9.99 tape, £14.99 disc



Colin

THE instruction sheet details a mega cast of special characters and features, some of which have been implemented on the Amstrad version. I had difficulty finding most of them.

Nevertheless, I found Desolator to be a pleasant enough game. Short on blood and guts; long on colour and playability.

12/20

METROPOLIS

LISTEN closely, for you are about to learn a piece of computer game history. Long ago, when the Ocean/ Imagine conglomerate was but a twinkle in Mr Ward's eye, programmers were fabled to be whacky. Really zany, the lot of them.

They would quite happily spend months programming new and innovative games for nowt but the dream of fame.

These games were hailed as masterpieces because they had bouncy sprites, wobbling koalas, exploding plastic inevitables and portly, lovable heroes.

They involved carrying out logical tasks, such as putting chocolate in the toaster to open the hamster cage on screen six. But most of all, they had left/right/jump controls.

And since most of these games appeared on the Spectrum, they also had that most amazing feature – Colour Attribute Clash.

Metropolis would have been a classic had it been published five years ago, because it has most of the necessary features. True, the wobbling koalas and the exploding plastic inevitables are missing, but the colour clash is there in all its glory.

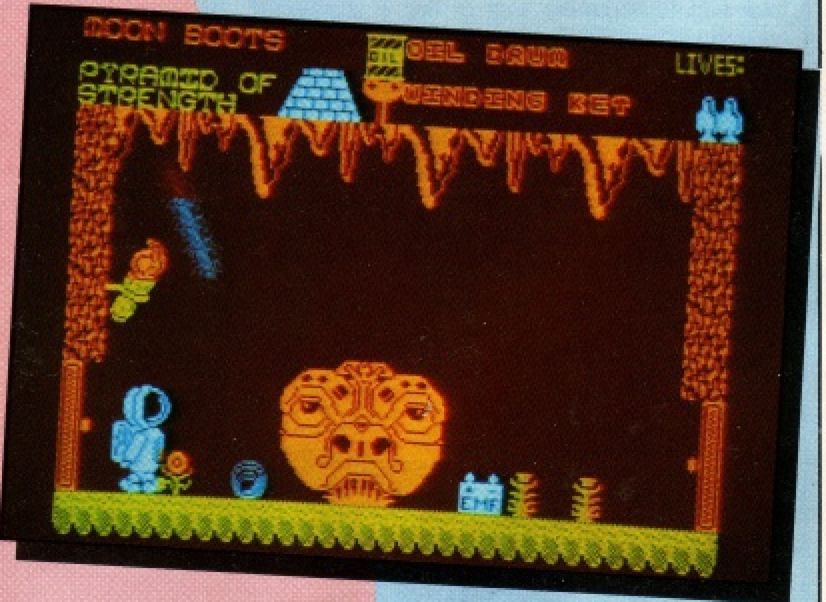
The spiel claims that Moonboots, the Lunar explorer, is trapped in Metropolis and needs to find and refuel his spaceship to escape.

He is aided and abetted by several friends, who are each capable of doing different things, but Moonboots must be carrying the right objects to assume control of one of them.

Consulting Jane's Book of Computer Game Plots, I find that this conforms to plot number PYJ1, "Gormless hero escapes from nasty surroundings".

This game reminds me of a party political broadcast – pointless and only faintly amusing.

Author: Neil Latarche for The Power House
Price: £1.99 tape



Colin

THE all-pervasive enforced whackiness of this game wore me down immediately; I was reduced from scepticism to complete torpor in under a minute.

I could list all the game's good points in two-inch capitals quite comfortably on the head of a pin. It is a shame to see such a bad game from Neil Latarche, considering he did a fair job of Uridium on the Amstrad.

5/20

CAPTAIN BLOOD

YES, it's time to explore the galaxy again, this time under the guise of Captain Blood, searching for five clones that have been scattered around the galaxy. How the clones came to be scattered around in the first place is explained in the short story supplied. I think.

Said story is a bit weird in places, but basically: "Blood" is the pseudonym of a famous arcade game programmer, now on Skid Row. In typical Tron tradition, he injects himself into a computer-generated existence to meet the threat of giant invading PacMen (told you it was weird).

Unfortunately, after escaping certain death from an attack of Space Invaders, he accidentally clones himself. This is a Bad Thing, and to have any chance of surviving, Blood must hunt down and destroy the clones and reclaim his vital fluid before he is completely replaced with artificial implants.

This is where you take over, piloting Blood's custom-built spaceship – the ARK. (Moves like a fish, steers like a fish, looks like an asteroid.)

You start your search for the clones in orbit around an inhabited planet, sort of leftish and up a bit from the centre of the galaxy. On the main screen, the planet spins before you.

You guide Blood's hand over the control panel with the keyboard or joystick, and press on the icons representing the possible options. The icons don't really look like anything except icons, so it's lucky the instructions explain what you can do.

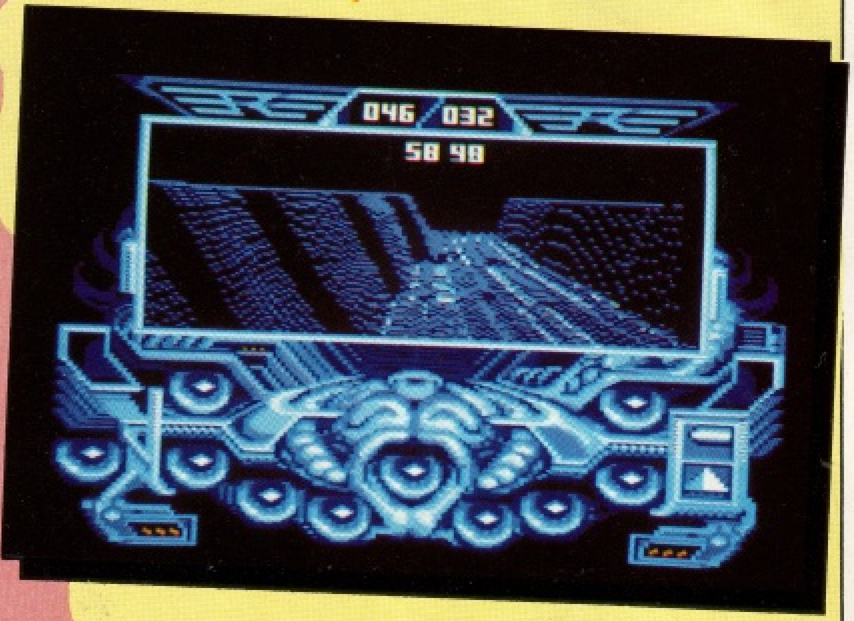
One of the things you can do is launch a remotely-controlled Oorxx to land on the planet. The Oorxx is a bio-engineered life form developed from an extinct alien species, according to the story.

To land successfully you must guide it (that's guide the Oorxx, not the bio-engineered life form developed from an extinct alien species) through the fractal generated 3D mountains avoiding defence mechanisms in the cleverly done (and optional) flight sequence. At the end of a canyon you meet the inhabitant of the planet, who may be one of several species detailed in the instruction manual. Typical species include Tubular Brains, Robheads and Sinox.R

To talk to the alien you must use the UPCOM (Universal Protocol COMunication) device which converts both your own and the alien's speech into strings of icons.

Again, the icons could really represent anything, but an automatic dictionary will translate for you. Talking with aliens is a bit like talking with a Sun reader: It takes time to get the point across.

The purpose of taking truck with the aliens is to get information about the whereabouts of the clones, but it's not easy. Some want to talk about their unsuccessful love lives, some will spit nothing but numbers at you and swear – a degree in alien linguistics would be very helpful.



Aliens can sometimes be persuaded to talk if you act as an interplanetary taxi service for them, although to teleport them you must first convince them that you won't do anything untoward once they are on board. You can't just lean out the window and offer them some sweeties.

If you have managed to get the coordinates of another inhabited world from the alien you can plot your course on the galactic map and perform a quick hyperspace jump, which involves lots of sound and flashing stars.

Flying to places at random is a sure way to get very lost, because not all planets are inhabited, and space is a very big place. To quote the instructions: "... trusting your luck is a non-viable survival option".

Author: Ere International for Infogrames
Price: £9.95 tape, £14.95 disc

Colin

ERE International's graphics and fractal landscapes are mighty impressive – my personal favourite is destroying the planet, which happens with a brilliant explosion – but the gameplay is strange.

Captain Blood is a very interesting experience, and if talking to extraterrestrials is your thing, it could be right up your street.

15/20

Nigel

THE graphics are very pretty, especially the rotating planets and the weird talking aliens. Sound during the game is uninspiring, but the title screen has music written by none other that Jean-Michel Jarre.

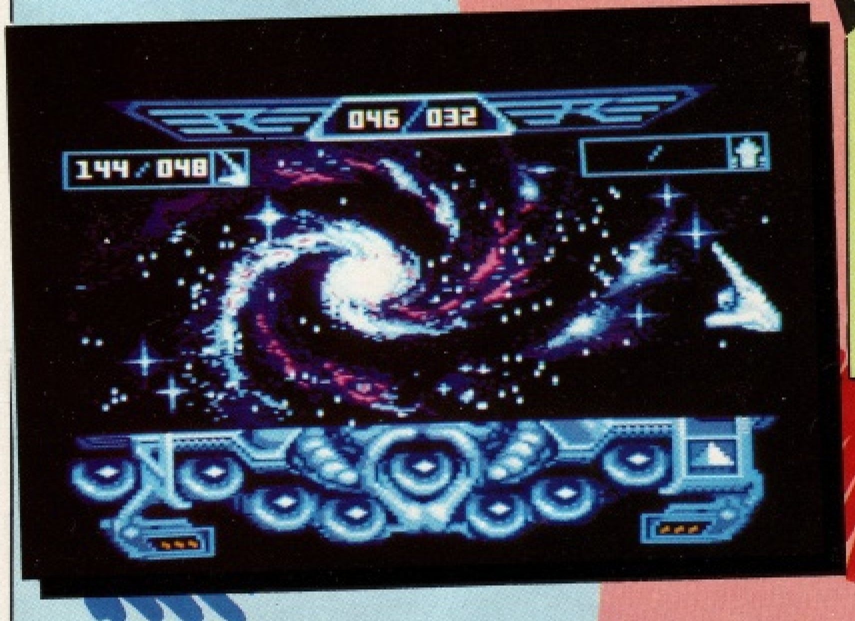
Although the CPC's sound capabilities are not quite up to a Rendezvous Houston standard, the style is definitely Jean-Michel's, and not, thank goodness, just an Oxygene rip-off.

17/20

Liz

YOU are allowed to save your progress so far to disc, and it seems this is a good idea, since completing the game could take a long time. The disc version game needs to access the disc when talking to aliens, but even though I forgot to replace to game-disc the program didn't crash – it just waited for me to put it back in, which is more than some other games I could mention would do.

16/20



ASTROBALL

IN common with virtually every other game written, Astroball features an heroic quest by some clean-living, square-jawed, public- spirited being.

Trouble is, Astroball is a small squidgy green blob which would have enormous difficulty in being any of these things. He (it could be she or it, but square-jawed heroes are invariably male) must pick up the scattered magical items that of right belong to his people.

The omnipresent Malevolent Powers have nicked these goodies and scattered them in the Evil Forest. Our heroic spheroid, armed with nothing but a cute expression, must bounce about collecting these objects while avoiding too many collisions with the leering trees.

Each collision depletes his energy, the predictable messy ending ensuing if it reaches zero.

Astroball's horizontal movements cannot be adjusted, but his vertical motion is controllable by the player. For a one character square bouncy blob, he has a remarkable and amusing range of expressions.

The entire range from extreme pain to utter dejection is there, including a neat raspberry blowing routine.

From the outset, this game suggests that it has been written almost entirely in Basic – it's more like a beefed up magazine listing than a commercial game.

The sound and graphics are not what could be called brilliant, but the graphics are fast and well animated – for Basic with additional RSXs, that is.



Colin

THIS game would certainly impress parents if it had been their kid's, but it shouldn't really have gone past that stage because this is a piece of homegrown software, slightly tarted up to impress unfussy publishers.

Getting Astroball stuck in a corner is a little annoying, and the sound verges on the dire, but it's cute nonetheless. Not brilliant, but on the whole quite enjoyable in a lobotomised sort of way.

I await the ZX81 conversion with high hopes of enhanced features.

12/20

Author: Frederick Akinlawon for The Power House
Price: £1.99 tape

METAL ARMY

GENERAL Ironside and his Metal Army have stormed Slough nuclear power station and planted a time bomb above the reactor. If the bomb explodes it will destroy the reactor together with a large chunk of the surrounding area for good measure.

Some people might think of this as not so much a terrorist action but more a well thought out example of creative town planning. The Mayor of Slough, however, is more than a trifle miffed.

In desperation he has called on the one man – Harry Chainsaw – whose skill, strength, animal cunning and total lack of comprehension make him the ideal person to send on a suicide mission against the deadly automated combat units of the Metal Army.

You control Harry on his mission to locate and deactivate the bomb. As you search through the maze of passages within the power station complex you should beware of the combat units which kill on contact.

Fortunately, the Mayor has seen fit to issue you with a short-range thermoplasma servo-blaster which which will restrain and eventually destroy the mechanoids. In these days of turbulent town hall politics, this is obviously a handy object to keep tucked within your ceremonial robes and beats waving a mace about as a form of self defence any day.

When necessary, your blaster's energy level may be recharged from one of the flashing power points. Additional hazards to watch out for are the coolant gases, electric charges and spent fuel rods that the reactor's automated systems regularly discharge. These will also prove fatal if touched.

One big niggle: In order to gain access to certain parts of the complex you will need to collect security passes. These are easy to spot as they are coloured green. Maybe, one day, games programmers will remember that not everyone has a colour monitor.

That apart, Metal Army is an addictive game that is easy to learn but hard to master. It combines plenty of action with graphics that are eye catching and colourful. A remarkably good game and excellent value.

Author: Mark Haden for Players
Price: £1.99 tape

Colin

THERE is nothing startlingly new about Metal Army, but at budget prices you don't expect innovation. This is a fun game which is really all you want. It is also addictive – I sat up into the wee small hours over a cup of cold cocoa having "just one more go".

17/20





BLOOD BROTHERS

COMPUTER games would certainly be at a loss without the "rich planet just waiting to be plundered" scenario. Blood Brothers follows this trusted pattern.

In this case the planet is known as Sylonia, home of the heroes – and brothers – Hark and Kren.

These two Sylonian slickers were just out having a quick joyride on their turbo-injected Skywalk jetbikes when who should mowsey along to their residence but those nasty Scorpions.

Cads and bounders to a man, the Scorpions – for those unversed in B computer game plots – are just a tad unpleasant. They like gems, something that Sylonia has plenty of, but they don't like paying for them. Pillage and burn is more their style, with a spot of kill mixed in to liven things up.

The Sylonians are meant to be peaceful, but since non-violent shooty games sell about as well as salt'n'vinegar flavoured ice lollies, it is just as well that the Brothers have some handy weapons about their persons with which they may shoot the obligatory flying nasties.

But the Scorpions can only be defeated by collecting all the pilfered gems – a rather hackneyed plot in these enlightened days.

Despite the fact that not one Scorpion is ever encountered in their underground mines, gameplay is kept from being utterly rancid by a unique two-player option.

This allows both players to cooperate in one room, or for each player to go off in their own direction. Sadly, only one of the players is visible if they have split up, but they can be switched between quite easily.

However, the days of the "shoot the block to open the maze and get the loot" game is long past, and this one should have gone with it.

Blood Brothers is a mediocre two-player game that doesn't deliver the goods even for a single player. All in all, Gremlin really shouldn't have bothered.

Author: Gremlin Graphics
Price: £9.99 tape, £14.99 disc

Colin

THE Brothers must wear woollen suits, because if even a toe is dipped in the water they are sunk – literally. However, the gun recoil is a new idea, but play the game for five minutes and you find out why you've never seen it before – it's dire.

Blodgey graphics, iffy sound, awkward controls and creaking gameplay go to make Blood Brothers eminently forgettable. As Ray Bradbury once said, "Oh."

9/20

KARNOV

KARNOV, a fire-breathing Russian strongman, has returned to his home village, Creamina, located somewhere in the vast wilderness of the steppes.

After a lifetime spent travelling with a circus, he is looking forward to a peaceful retirement. But it is not to be.

Unknown to Karnov, Creamina has for centuries been the hiding place of the Treasure of Babylon and legend has it that a great evil will visit the world if the treasure falls into the wrong hands.

Now Ryu, a wizard of awesome power, has located the treasure and, aided by his evil minions, has carried it off, leaving behind hordes of terrible monsters to terrorise those villagers who remain.

Karnov realises that only he has the power to defeat Ryu and return the treasure to its hiding place. He sets off through the monster-ridden countryside seeking the fragments of a lost map to guide him on his quest.

As you control Karnov on his adventure you must attempt to collect a number of icons. These will increase your strength and firepower, providing you with weapons to use against the enemies you will meet.

The game has been developed by Electric Dreams Software from the original Data East arcade game, and shows it by the scope, detailed graphics and range of locations through its nine levels of gameplay.

It is not an easy game to master, combining both strategy and fast action. Whether this makes it an addictive challenge or a turn off depends upon your reserves of skill and patience.

Karnov is also a multi-load game. If you are playing the cassette version, this can lead to some frustrating delays while you rewind to level one.

But unfortunately this is a price that has to be paid for the amount of detail in the game.

Author: Mr Micro for Electric Dreams
Price: £9.99 tape, £14.99 disc

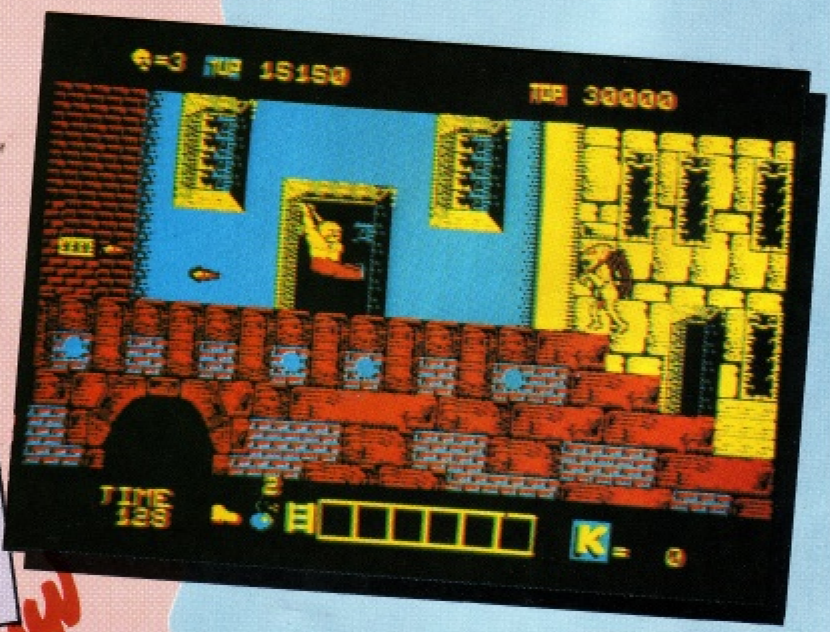
Nigel

SOME arcade games translate on to home machines as Ben Hur does on to a six-inch portable TV. Karnov is not one of these, although the graphics are not as good as the blurb on the cover would have you believe.

It is packed full of problems, however. Perhaps too full. The dividing line between a successful encounter and oblivion is a fine one, and the constant restarts become irritating.

Despite my reservations, I found myself picking up my joystick time and time again for just one more try.

15/20



THE RACE AGAINST TIME

CHARITY, it would seem, is currently the name of the game. Preferably served up with several bucketfuls of glitz and as much razzmatazz as can be crammed into any one place at a time.

And why not? There are more deserving causes in this world than many of us will ever realise, and if people have to be prodded by a cavalcade of celebrities before they'll dip into their pockets, then so be it.

The trouble is that some of these philanthropic efforts seem to be long on hype but short on quality. The original multi-national fund raiser, Band Aid, was not only in aid of a worthwhile cause but it produced a great record in its own right.

Yet some of the follow up attempts have been notable mainly for the number of "superstars" seen bobbing up and down in the background who provoke the reaction: "Cor, I haven't seen him/her for years".

The latest of these global events is Sports Aid 88, one of the highlights of which is the worldwide Race Against Time in September.

In the 1986 event Omar Khalifa, the legendary Sudanese athlete, led the way for 20 million people in 89 countries to raise money. Omar Khalifa now features in The Race Against Time game from Code Masters, who are donating the profits from the sales of the game to Sports Aid.

So, is TRAT just another fund raising attempt that fails to match up to its noble intentions? Most emphatically not. Based upon the theme of the Sports Aid programme, it has been coded by the Oliver Twins, whose own track record is impressive.

As Omar Khalifa, your task is to run around the world carrying the torch of Sports Aid 88. In order to encourage people to join Sports Aid you must raise a flag and light a flame in a bowl on each of six continents.

When you have completed this task you must run to the United Nations building and light the final flame.

You are running against the clock, so speed is of the essence, although you can gain more time by picking up the hour glasses you will find on your way.

Travel between continents is accomplished by choosing a destination on the world map at the airport. There are more than 100 locations, many of which feature famous landmarks. It becomes a game within a game to identify the places as you go.

You will find a number of flashing arrows which will enable you to go "into" the screen to the next location.

At all costs avoid getting wet – this will douse the torch and the game will be over.

On your journey you will encounter many obstacles and find certain objects which will help you overcome them. The interest lies in determining which object will help with which obstacle.

As you play the game you will learn that locations have to be visited in the correct order to enable you to collect the objects you will require. Even when you have mapped out a correct strategy, success is not guaranteed.

A number of obstacles require skill and coordination to overcome them.

TRAT provides an opportunity for all armchair fanatics to do their bit. For those people whose best developed muscle is in their joystick thumb, it provides an ideal way to join the rest of the world in the fun and games.

It's a very good game and a worthy cause. What more incentive could you want?

Authors: The Oliver Twins for Code Masters
Price: £4.99 tape.





Nigel

TOO many software houses these days seem to confuse quantity with quality. Games come with five-inch thick rule books and accompanying mini novel written by a programmer with aspirations to be an author, whose idea of good writing is to strip every other verb out of the English language in order to make it run faster.

The Race Against Time has been designed for anyone to play, with few rules and commands to learn before getting down to the action. This is a point very much in its favour.

19/20

Colin

IT is rare for a computer game to live up to its hype, but The Race Against Time does just that. The graphics and sound, including the music, are superb; the gameplay is simple but absorbing, due not only to the abundance of locations, but also to the speed with which one can jog through them.

Must be worth buying if only to see the sights and hear the sounds.

20/20

Liz

THIS game is good. From the concept, through the multiple locations and excellent graphics, to the accompanying music – a creditable realisation of Peter Gabriel's Games Without Frontiers – The Race Against Time simply oozes quality.

20/20

STREETFIGHTER



SINCE the apocalyptic Way of the Exploding Fist, beat-'em-up games have been released periodically. Streetfighter is yet another to add to the list.

The first backdrop is suitably Japanese, with temples, pagodas, statues and other bits of architecture. All you have to do is to knock your opponent flat or drain his energy until he quits. You can try high kicks to the head, or punches to the body and trips.

In true cartoon-strip style, every time you hit your opponent there is a bang and a small graphic explosion appears.

Of course, your opponent isn't just soaking up the punishment – he's trying to force your teeth down your throat as well. To avoid the blows you can either duck, move back, or execute a flying leap with about six somersaults through the air.

Unless somebody is knocked out, bouts last four minutes: If the opponent is still standing at the end, you lose. Matches are the best of three bouts. You normally win the first, and then lose the next two as the opposition steps up a gear. Losses are accompanied by a variety of cheeky remarks.

If, by some miracle, you win two bouts out of the three, you are congratulated and another fighter's data is loaded in ready for you to try your luck again.

The graphics are very good. Only four colours are used – which look very dim on a green screen monitor – but they are applied well with lots of detail, particularly in the backgrounds.

Animation is excellent – the fighters move very gracefully and have a lot of different poses. The scrolling is jerky, but you don't really notice this in the heat of battle.

Unfortunately there is practically no sound – just a few spot effects, and no tunes.

Liz

SUPERBLY unoriginal. If you like this sort of game, Streetfighter is a must. Unlike Way of the Exploding Fist, there are no complex combinations of keys to learn – you just hack away at your opponent, making sure you duck at the right times.

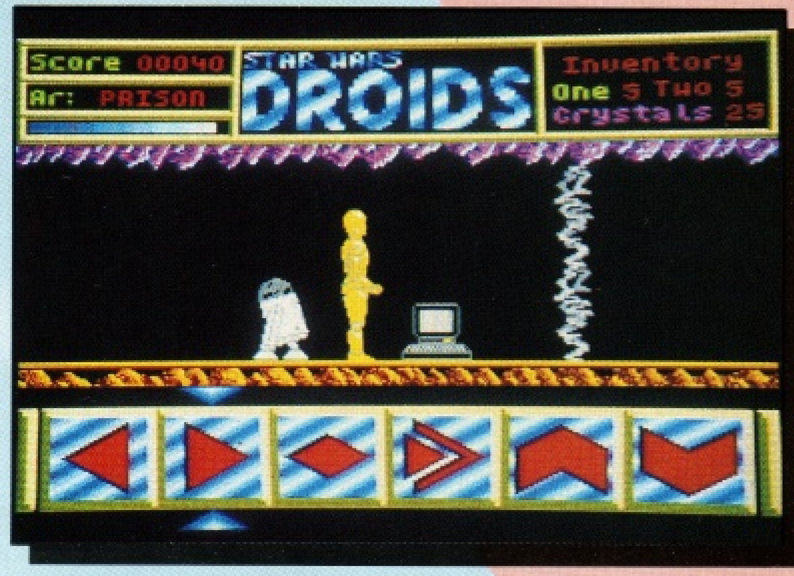
Pity there's no music, but you can't have everything I suppose, and the gameplay is excellent anyway.

But couldn't the creative juices have been channelled into something more original?

14/20

Author: Go!
Price: £9.99 tape, £14.99 disc

DROIDS



THIS must be a world speed record. No less than 11 years after the blockbusting film hit the streets, Mastertronic has released a Star Wars tie-in concerning the adventures of C-3PO and his dustbin.

Heralded as "a nail-biting drama", you guide C-3PO around a scrolling landscape with R2-D2 in tow as if he were attached to the end of a piece of elastic.

He is a nuisance, which I suppose is consistent with the film.

Moving around is done in a very strange manner. Instead of the usual left, right, up, down and fire keys, there is a row of icons along the bottom of the screen with pictures representing these functions.

You move a pointer to the icon you want, press fire, and C-3PO does the necessary, with R2-D2 following doggedly behind.

On your travels you pick up numbered passes and lying around are some very well animated computer terminals. Each terminal has a number.

If you plonk C-3PO in front of the terminal and press fire, you will be able to open a door, remove an obstacle or control a lift – as long as you have the correct number pass and get through a memory test.

This memory test is annoying. The computer plays musical notes and flashes colours; you have to match these colours and notes by pressing keys 1 to 6 in the appropriate order, rather like the old Simon toy.

At first you only have to remember three notes, but the sequences quickly get longer.

The game ends when the metallic duo's energy runs out. It can be drained by drills, cannons, electric and magnetic fields, sprinklers, sparks, and patrolling droids, and C-3PO can only dodge these hazards or fire crystals at the nasties.

The crystals are limited in number, and have an annoying habit of running out at precisely the wrong time.

The graphics are quite good and the scrolling is smooth. The playing area is very small – it only takes up about one third of the screen, the rest being taken up by the icons and the energy and score indicators. Everything is crystal clear in green.

Sound effects are fairly limited, but there is a very good title tune, accompanied by one of those (yawn) scrolling messages.

Author: Binary Design for MAD
Price: £2.99 tape

Colin

C-3PO and R2-D2 always struck me as being lovable rogues, but here they just look flat and boring; there's none of the atmosphere connected with the film.

Yet another "move around a scrolling landscape and pick up everything in sight" game to add to the thousand or so that already exist.

11/20

Fine weather friend



Jeff Walker finds that those who take a dim view of arrays will never make it to the fifth dimension



WHAT is an array? Well, Chambers 20th Century Dictionary defines an array as a matrix. That helps. What is a matrix? Back to Chambers. Hmmm. A matrix is an array. Sheesh! (Throws big red book valued at £15 across office and reaches for small blue Oxford Paperback Dictionary valued at £3.25). Let's start again...

What is an array? Well, an array is an arrangement of data in a computer, so constructed that a program can extract the items by means of a key. (Oxford 1 Chambers 0).

A better word for "key" is probably "index". The index of the array – the bit in brackets after the variable name – is your means of quickly finding data anywhere in the array.

The array itself – which can be enormous, as we'll find out later in this article – is held in a single variable. But before we can start inserting or extracting data, we need to let the computer know how big the array is going to get – how many "elements" there are to the array. This is so Arnold can reserve a chunk of memory especially to hold the array data – a chunk of memory that cannot be overwritten. We reserve this memory by giving the area some dimensions:

```
       DIM array(1000)
        /     \     \
dimension...  \      \
  ...this variable... \
           ...to be this big
```

We can have three different "types" of array – integer, floating point and string – and each type takes up a different amount of memory.

Integer arrays take up the least space. Each element of the array will need two bytes of memory reserved for it. We pay a price for this though – integer arrays can only hold numbers in the range -32768 to 32767. However, the size of the array remains static. If each element of the array held the value 32767, the array would take up no more memory than if each of the elements were assigned the value zero.

Floating point arrays need to reserve five bytes of memory for each element and, like integer arrays, the size of a floating point array is static. But unlike integer arrays, floating point arrays can hold just about any number or fraction of a number you are likely to want to use. Hence the need to reserve five bytes of memory for each element.

String arrays take up the most room, although

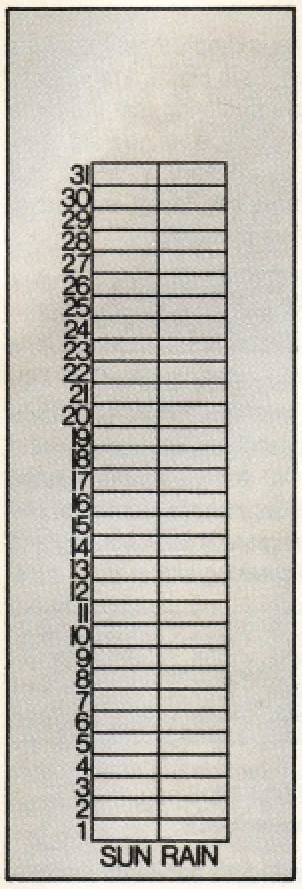


Figure I: The second dimension

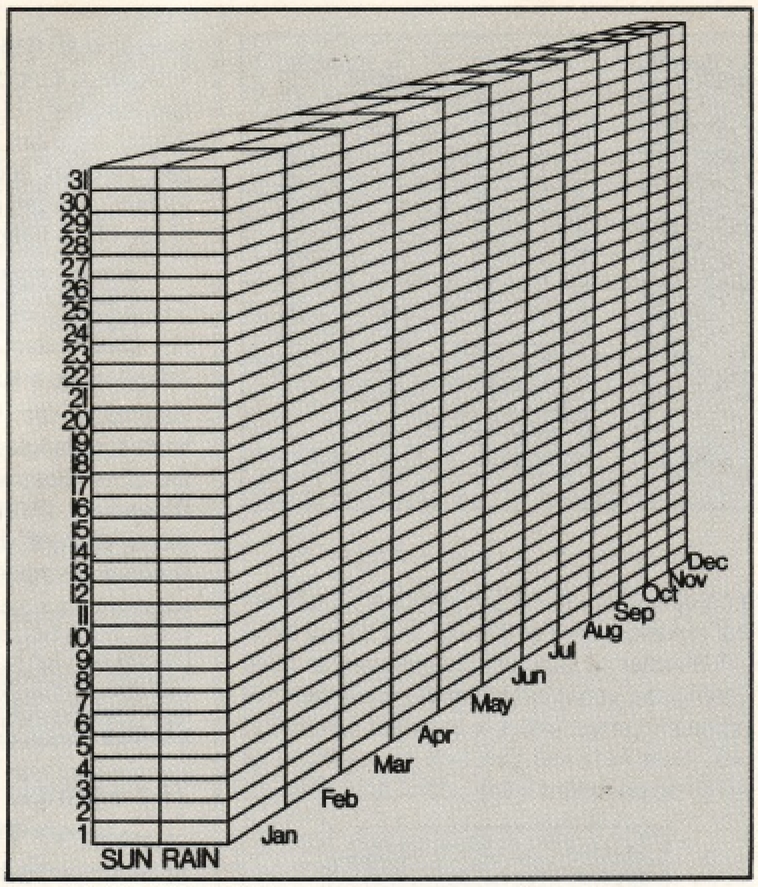


Figure II: The third dimension

this isn't at first apparent when dimensioning the array. You see, Arnold reserves only three bytes of memory for each element in the string array. But unlike the two numerical types of arrays, the actual data is not held in these three reserved bytes.

What these bytes actually hold is the length of the string and the memory address of where Arnold has stored that string. The first reserved byte holds the length – an integer in the range 0 to 255 – and the second and third reserved bytes hold the address, which will be somewhere high in memory in the same area that Arnold keeps track of all program variables.

But you don't have to worry about all this. Arnold will sort it all out for you so quickly that you won't even realise he's done anything. What it does mean, though, is that string arrays are "dynamic" – they have no fixed size. So that if each element of the array held a three-character string, it would take up a lot less memory than if each element held a 255-character string.

Are you with me so far? Good, because this is where things can start to get a little more complicated.

No. Come back. Just my little jest. Actually, the next bit's pretty simple...

Starting from zero

Although humans are more comfortable counting from the number one, in the computer world we always start counting from zero, and that goes for arrays, too. If we dimension an array to 5 then it will have six elements – 1 to 5 plus the zeroeth element.

So if we DIM a(5), the separate elements of this array are a(0), a(1), a(2), a(3), a(4) and a(5). (The identifying numbers in brackets after the variable name are known as subscripts). As we've given the array a() only one dimension, we can call a() a one-dimensional array. To insert data into this array is simply a case of typing a(2)=60 or a(1)=100. To extract data is just as simple: b=a(5) or PRINT a(3).

One-dimensional arrays are very simple, and we won't dwell on them here except to mention that they are sometimes called vectors or lists. Multi-dimensional arrays are much more exciting.

The rain in Spain

Imagine we wanted to keep a record of how much sun and rain happened on every day for three years in two far apart cities. How would we go about dimensioning an array to hold this data? Indeed, does Arnold have enough memory to hold all this data in memory at one time?

We can find out the answer to the second question by working out on paper how many dimensions such an array would need, and whether it would need to be an integer, floating point or string array.

I can see five obvious dimensions here:

- Sun/Rain: two elements, data is of the floating point type. (For example, 5.6 hours of sun, 0.01in of rain).
- Days: 31 elements, data is of the integer type (the day of the month from 1 to 31).
- Months: 12 elements, data is of the integer type (the number of the month from 1 to 12).
- Years: three elements, data is of the integer type (0, 1 or 2, standing for year1, year2 or year3).
- Cities: two elements, data is of the integer type (0 or 1, standing for city1 or city2).

We've got a problem. All the dimensions are of type integer except the first. This means the whole array has to be of type floating point, forcing Arnold to reserve five bytes for each element of data, regardless of whether it is integer or not.

```
100 ' Weather Manager skeleton
110 '
120 DEFINT a-y
130 GOSUB 220 'initialise
140 GOSUB 410 'get date
150 GOSUB 500 'get city
160 GOSUB 580 'get sun/rain
170 '
180 END
190 '
200 ' Initialise S/R
210 '
220 DIM Weather(1,31,11,2,1)
230 DIM Month$(11),City$(1)
240 Sun=0:Rain=1
250 London=0:Glasgow=1
260 FOR loop=0 TO 1
270   READ City$
280   City$(loop)=City$
290 NEXT
300 FOR loop=0 TO 11
310   READ Month$
320   month$(loop)=month$
330 NEXT
340 DATA London,Glasgow
350 DATA Jan,Feb,Mar,Apr,May,Jun
360 DATA Jul,Aug,Sep,Oct,Nov,Dec
370 RETURN
380 '
390 ' Get date S/R
400 '
410 CLS
420 PRINT"Enter date (dd,mm,yyyy)"
430 INPUT Day,Month,Year
440 Month=Month-1
450 Year=Year-1988
460 PRINT:RETURN
470 '
480 ' Get city S/R
490 '
500 PRINT"Select 1) London ";
510 PRINT"or 2) Glasgow"
520 INPUT City
530 City=City-1
540 PRINT:RETURN
550 '
560 ' Get sun/rain data S/R
570 '
580 GOSUB 700 'display city/date
590 PRINT"Enter hours of Sun"
600 INPUT z:PRINT
610 Weather(Sun,Day,Month,Year,City)
    =z*100
620 GOSUB 700 'display city/date
630 PRINT"Enter inches of Rain"
640 INPUT z:PRINT
650 Weather(Rain,Day,Month,Year,City)
    =z*100
660 RETURN
670 '
680 ' Display city/date S/R
690 '
700 PRINT City$(City);
710 PRINT Day;
720 PRINT Month$(Month);
730 PRINT Year+1988
740 RETURN
```

Listing I

But hang on. The periods of sunshine are always given in hours and tenths of hours, and the depth of rain is always given in inches and

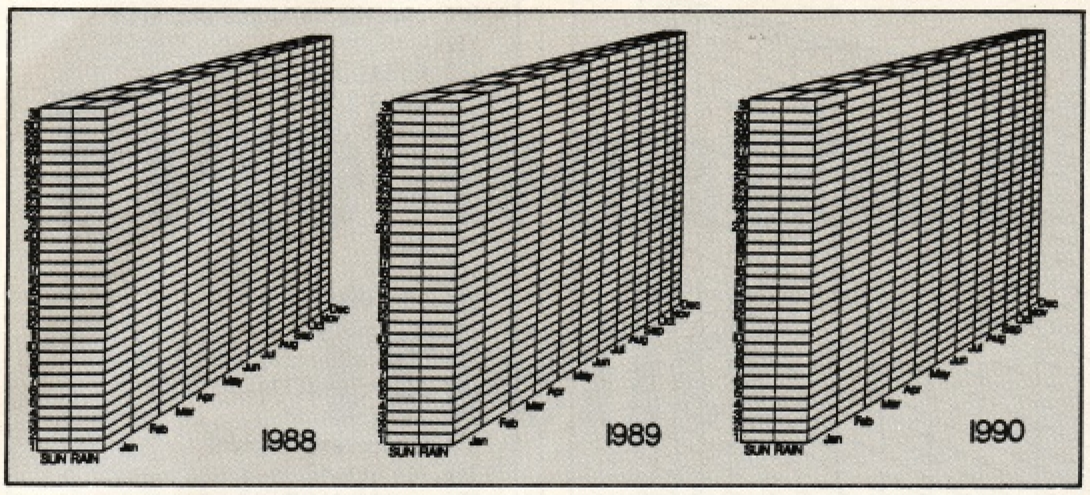


Figure III: The fourth dimension

hundredths of inches. Hmmm. How about if before we insert the Sun and Rain data into the array we multiply the figures by 100?

This would always convert both Sun and Rain floating point values to an integer, meaning we can dimension the array as type integer and save loadssa space. Then as long as we remember that we've multiplied it by 100, when we extract the data all we have to do is divide by 100 to get the correct value back.

So, if we name the array variable Weather%, remembering that we have a zeroeth element we could dimension this array to:

```
DIM Weather%(1,31,11,2,1)
              / / / / /
    Sun/Rain  / / / /
        Days  / / /
       Months / /
         Years /
         Cities
```

Now we can work out how many elements there are in the whole array. Remembering again that there is one more element per dimension (the zeroeth one), the calculation is:

$2 * 32 * 12 * 3 * 2 = 4{,}608$ elements

And since we know that each integer element needs to have two bytes reserved for its data, the number of bytes taken up by the Weather%() is:

$4{,}608 * 2 = 9{,}216$ bytes

Which, would you believe is exactly 9k. Bet you think that was a fluke. Well, you're right. It was. But it was also the result of some careful planning by means of diagrams on paper beforehand...

Making life easier

One, two and three-dimensional arrays are easy enough to visualise and therefore they are also easy enough to sketch on to paper. Figure I shows a 2D array: One column each for Sun and Rain, and 31 rows to accommodate the maximum number of days in the month.

Figure II takes our array one step further to accommodate the 12 months of the year. Look at it carefully and you will see that every day of the year has a box for Sun and a box for Rain. Some months, like February, don't use all their boxes, but that isn't a problem. We just ignore the boxes that represent days of the year that do not exist.

If Weather%() was just dimensioned to three dimensions, and if instead of using numbers we assign the correct values to variables named Sun (=0), Rain (=1) and Jan (=0) through to Dec (=11), we can address any particular box like so:

```
Weather%(Sun,15,Aug)=560
Weather%(Rain,30,Jul)=1
```

Remember that we are multiplying the true values by 100 before inserting them into the array, so the actual values are 5.6 and 0.01.

Moving on from three dimensions, we hit a snag. How on earth do we draw a picture of four dimensions to represent the three years of data we want to cover? Well actually it's not as difficult as it seems. All it takes is a little thought and imagination.

Take a look at Figure III: It is a diagram of our array at its 4D stage and is simply three Figure II's enclosed in a rectangle. Each Figure II represents one year, the rectangle signifying that the three diagrams are part of a whole. If we now set three new variables equal to y1988=0, y1989=1 and y1990=2, we can address any day of any month of any of the three years by typing:

```
Weather%(Sun,7,Jan,y1988)=0
Weather%(Rain,22,Jun,y1990)=3
```

From here it is a very easy step to the fifth dimension. Yup, we put two Figure IIIs inside another rectangle and label one, say, London and the other Glasgow. OK. Assign London=0 and Glasgow=1. We can now address any day of any month of any of three years in both London and Glasgow by typing something like:

```
Weather%(Sun,21,Apr,y1988,London)=230
Weather%(Rain,3,Sep,y1990,London)=10
Weather%(Sun,15,Jun,y1989,Glasgow)=980
Weather%(Rain,5,May,y1988,Glasgow)=50
```

The example programs

So much for the theory – let's put it into practice. As usual, my example program is just a skeleton for you to work on. There is very little – if any – error trapping. You can put that in yourselves. And as we're dealing almost entirely with integers I've used DEFINT a-y, leaving Z to deal with any floating point numbers – like the Sun and Rain data before conversion to integer (see lines 580 to 660).

Apart from Weather(), there are also two string arrays in the program, Month$() and City$(), dimensioned in line 230. They just hold the

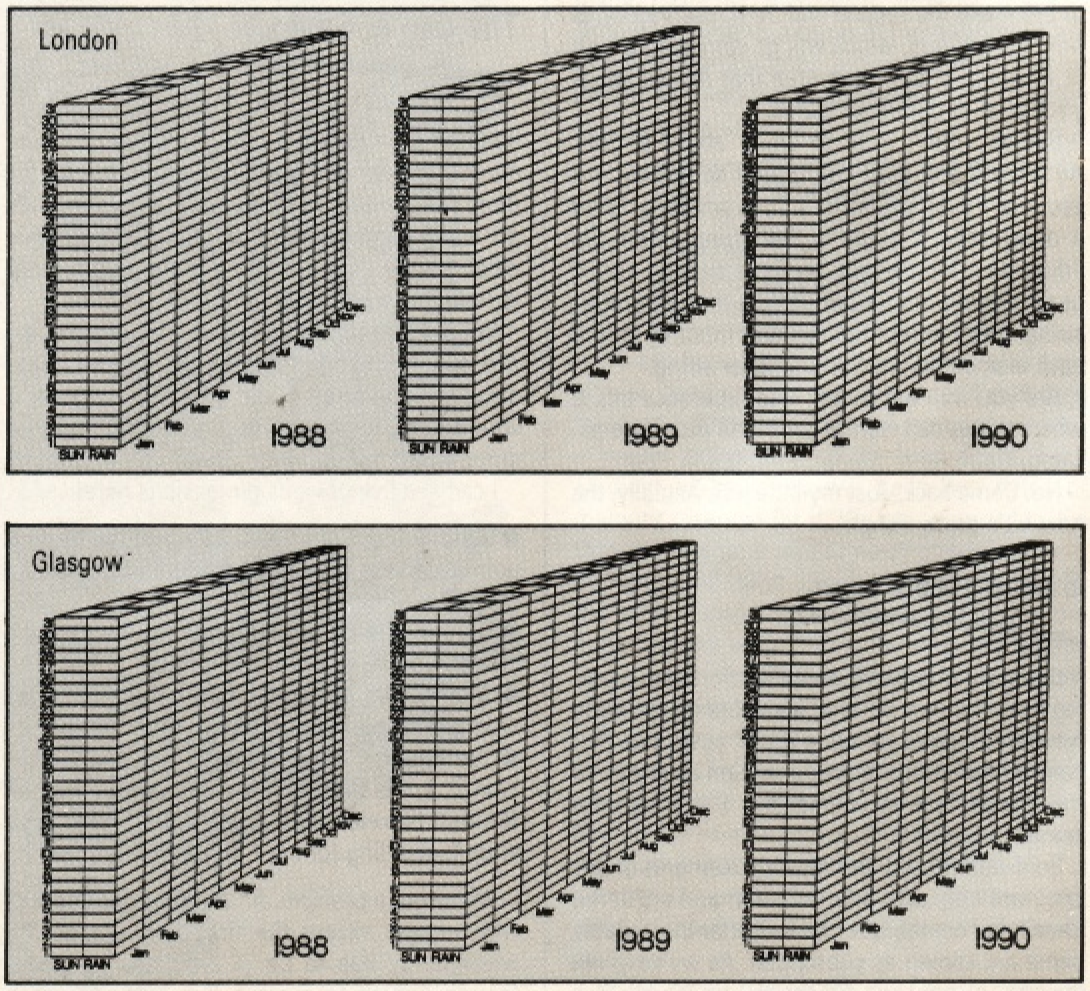


Figure IV: The fifth dimension

names of the 12 months of the year and the names of the two cities involved so we can display them when necessary (see lines 700 to 740).

As it stands, Listing I will just ask you for sun/rain data for one day in one city and then come to an abrupt halt. Some kind of loop needs to be added to enable the user to at least be able to enter the data for that day for the other city.

Also, a subroutine is needed to save the data, and another to load it. In fact, the old data will need to be loaded before new data can be tacked on to it and then saved again.

Let's take a look at how we save arrays. First of all we need to open a file. For loading we use OPENIN and for saving OPENOUT, but I'm not going to hand you this on a plate. The only way to learn Basic is to sit down and work the problem out for yourself. But I'll give you a shove in the right direction...

Listing II demonstrates the techniques used for saving, loading and displaying the contents of a one-dimensional array. Tape users should remember to rewind their tape after the program saves the array it creates.

Note the use of loops and the similarity between the load and save subroutines. You should think carefully about how the load subroutine in your Weather program will know how much data to read in. Maybe you could read in a few numbers saved at the end of the previous session that tell the load subroutine how much data to expect before actually reading it.

When the hard work of writing the Weather Manager data input/output routines is finished, you'll want some way of displaying the data. A screen full of numbers is going to be really boring. What we need is a graphical display of some kind. Rows or columns of asterisks would be simple.

At the end of the day you could end up with a fairly useful program that, given a couple of years' data, could maybe even predict whether it is going to rain or be sunny tomorrow.

OK. Off you trot and work out how to put Michael Fish and his colleagues out of business. Tarra.

```
10 MODE 2:size=24:DIM array(size)
20 '
30 GOSUB 1000      'fill the array
40 GOSUB 4000      'print it
50 GOSUB 2000      'save it
60 '
70 PRINT"Wiping array() contents..."
80 FOR index=1 TO size  'wipe out...
90 array(index)=0:NEXT '...the array
100 '
110 GOSUB 4000      'print it
120 GOSUB 3000      'load it
130 GOSUB 4000      'print it
140 '
150 PRINT"It's as easy as that.":END
980 '
990 ' fill the array
1000 PRINT"Filling array()..."
1010 FOR index=1 TO size
1020 array(index)=index
1030 NEXT:RETURN
1980 '
1990 'save the array
2000 PRINT"Saving array()..."
2010 OPENOUT"array.dat"
2020 FOR index=1 TO size
2030 PRINT#9,array(index)
2040 NEXT:CLOSEOUT:RETURN
2980 '
2990 'load the array
3000 PRINT"Loading array()..."
3010 OPENIN"array.dat"
3020 FOR index=1 TO size
3030 INPUT#9,array(index)
3040 NEXT:CLOSEIN:RETURN
3980 '
3990 'print the array
4000 PRINT"Printing array()..."
4010 FOR index=1 TO size
4020 PRINT array(index),
4030 NEXT:RETURN
```

Listing II

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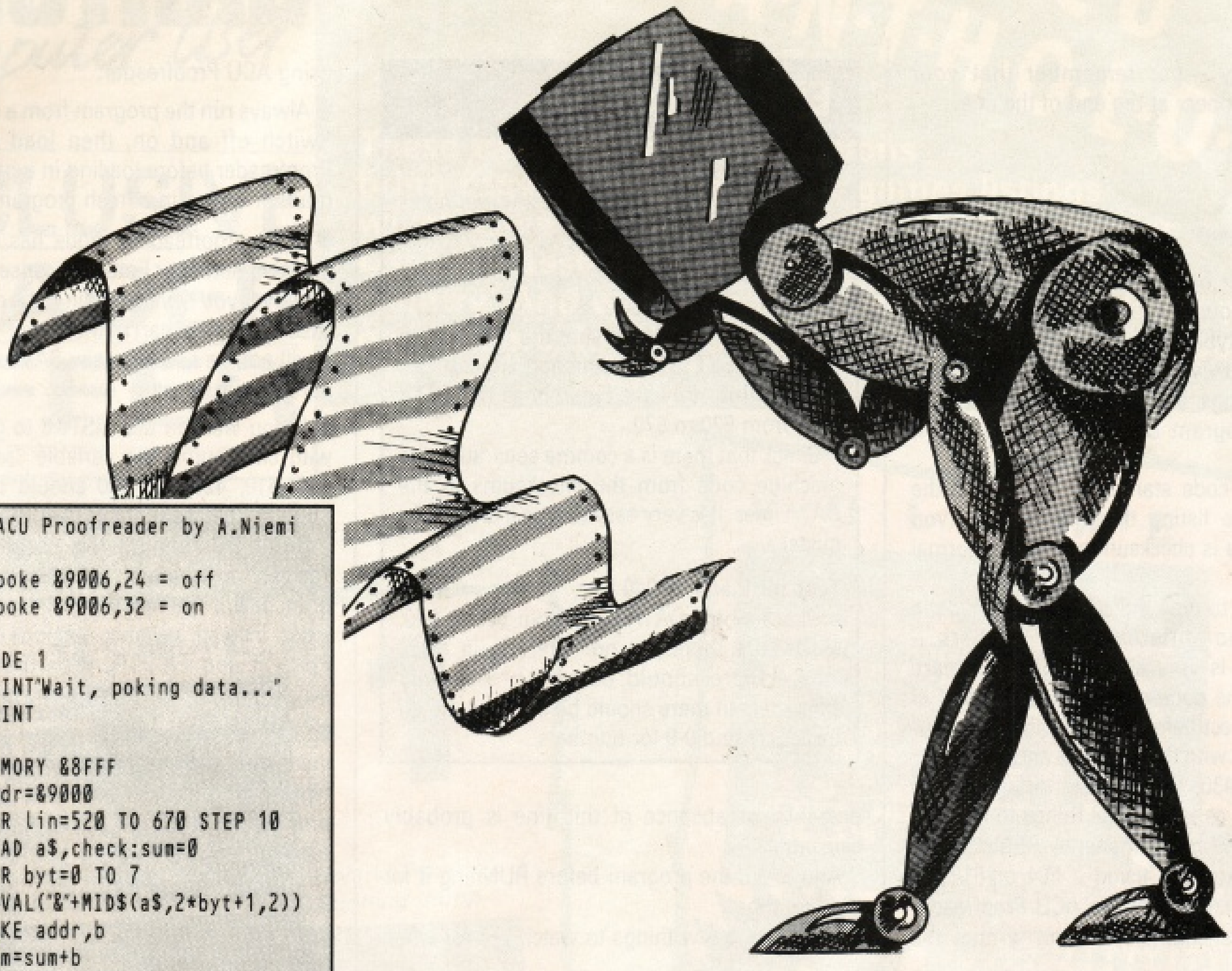
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```
[A1] 100 ' ACU Proofreader by A.Niemi
[A3] 110 '
[A5] 120 ' poke &9006,24 = off
[A7] 130 ' poke &9006,32 = on
[A9] 140 '
[B4] 150 MODE 1
[E9] 160 PRINT"Wait, poking data..."
[2E] 170 PRINT
[B1] 180 '
[6F] 190 MEMORY &8FFF
[6F] 200 addr=&9000
[6B] 210 FOR lin=520 TO 670 STEP 10
[B8] 220 READ a$,check:sum=0
[AC] 230 FOR byt=0 TO 7
[FF] 240 b=VAL("&"+MID$(a$,2*byt+1,2))
[61] 250 POKE addr,b
[98] 260 sum=sum+b
[27] 270 addr=addr+1
[3E] 280 NEXT
[95] 290 PRINT"Line";lin;
[B6] 300 IF check<>sum THEN PRINT"erro
     r":STOP ELSE PRINT"Ok."
[31] 310 NEXT
[A7] 320 '
[A9] 330 'Patches
[AB] 340 '
[65] 350 screen=&BB5A
[AA] 360 printer=&BD2B
[20] 370 FOR i=0 TO 2
[74] 380 POKE &906E+i,PEEK(screen+i)
[41] 390 NEXT
[BB] 400 POKE &9009,&A3 '* 464 only *
[5A] 410 POKE screen,&C3
[F0] 420 POKE screen+1,0
[E9] 430 POKE screen+2,&90
[AC] 440 '
[2D] 450 PRINT
[6C] 460 PRINT"Type POKE &9006,32 to t
     urn it ON."
[CD] 470 PRINT"Type POKE &9006,24 to t
     urn it OFF."
[33] 480 PRINT
[B6] 490 '
[6A] 500 NEW
[A7] 510 '
[7F] 520 DATA e5f5c5d5fe0d1862, 1273
[E3] 530 DATA 1189ac0100002101, 361
[22] 540 DATA 00131af6002833cd, 587
[D8] 550 DATA 1c9018f5bd2003fe, 919
[D6] 560 DATA 20c804fe27281af6, 841
[49] 570 DATA 20f5e600bd2005f1, 974
[3E] 580 DATA e6001801f16f0e00, 621
[21] 590 DATA 7c85670c79b820f8, 957
[DC] 600 DATA c93e20bdc435902e, 923
[7F] 610 DATA 00c93e20cd1c903e, 734
[E4] 620 DATA 20cd6e903e5bcd6e, 959
[0B] 630 DATA 907c07070707cd71, 614
[A7] 640 DATA 907ccd71903e5dcd, 1090
[58] 650 DATA 6e90d1c1f1e1cffe, 1583
[9B] 660 DATA 93e60ff630fe3a38, 1054
[9A] 670 DATA 02c6071883000000, 362
```

Now – ACU Proofreader

Lance Davis presents a new and revolutionary real-time listing checksum program for the CPC by Aimo Niemi

FOR ages now frustrated type-in addicts have been pleading with me to give them a listing checksummer. For ages now I have been telling these poor souls that we were looking for one. But we didn't want just an ordinary checksum program, we wanted the best. That is nothing less than *ACU* readers deserve.

Aimo Niemi sent us Proofreader from Finland quite a while ago. We were immediately impressed, but decided to give it a rigorous test over a period of some months.

Apart from one or two minor grumbles, Proofreader was acclaimed by our human guinea pigs as a major breakthrough in magazine-to-reader relations. We made the requested changes and ACU Proofreader is the result.

It works differently from any other listing checker you may have come across, using clever machine code to display a two-figure checksum enclosed in square brackets every time it encounters a carriage return.

This innovative approach to the problem means that you can check your program, line by line, as you type it in. Alternatively, you can tap a program listing in, run ACU Proofreader, and LIST the program to screen or LIST#8 to printer. A checksum will appear on the end of every line.

However, for two good reasons we will be publishing the checksums at the beginning of the line. Firstly because it makes the listings that much easier to read, and secondly to stop sleepy typists from typing the checksums in as part of the program. Our tests have proved it works

better this way – but remember that *your* checksum will appear at the end of the line.

Typing it in

ACU Proofreader has proofread itself, but these checksums obviously will not be of much use to you when first typing the program in. They are used here to show you what they will look like in future *ACU* listings, and so you have something to test the program on when you've got it running.

The machine code starting at line 520 is the only part of the listing that might cause you trouble, and this is checksummed in the normal way.

Take care not to type the same line of code in twice with two different line numbers – something that is very easily done. And make sure the machine code checksum at the end of each line is correct before running the program.

Take care also with the numbers and addresses in lines 350 to 430; the slightest difference will almost certainly cause strange things to happen.

Line 400 should be permanently REMmed out or removed if you are using a 664 or 6128. If strange things happen, or the ACU Proofreader checksums consistently come out wrong, the presence or absence of this line is probably causing it.

And SAVE the program before RUNning it for the first time.

There are a few things to watch out for when using ACU Proofreader.

- Always run the program from a clean machine. Switch off and on, then load and run ACU Proofreader before loading in a partly typed program or typing in a fresh program.
- Once proofreading mode has been selected, pressing Return or Enter will cause a checksum of whatever you have typed in to be generated. This checksum is not part of the listing – it cannot, and it will not, be saved by any SAVE command. It is purely a visual aid.
- If you want to use LIST#8 to get a hardcopy with checksums, the variable "screen" in lines 380, 410, 420 and 430 should be changed to "printer" before running the program.

  Don't try running the program, changing "screen" to "printer", and then running the program again. The result will almost definitely be a crash. Instead, save two versions of the program, PR-SCR and PR-PTR, with the variables set accordingly.
- Once the program has poked in the data and made the necessary patches, you will need to type POKE &9006,32 to switch your machine into proofreading mode. POKE &9006,24 returns your machine to normal.

ERRATHERAPY

Type mismatch in 220
Check line 220. Make sure the variables following READ are correctly typed as "a$" and "check".

Data exhausted in 220
Check line 210. Make sure the numbers in the FOR..NEXT..STEP command are correct.
Check that you have typed in all the DATA lines from 520 to 670.
Check that there is a comma separating the machine code from the checksums in the DATA lines. It is very easy to type a fullstop by mistake.

Type mismatch in 240
Check all the DATA lines from 520 to 670. Make sure there are no letter Os in there where there should be zero's. The only characters in there should be in the range a-f for letters and 0-9 for numbers.

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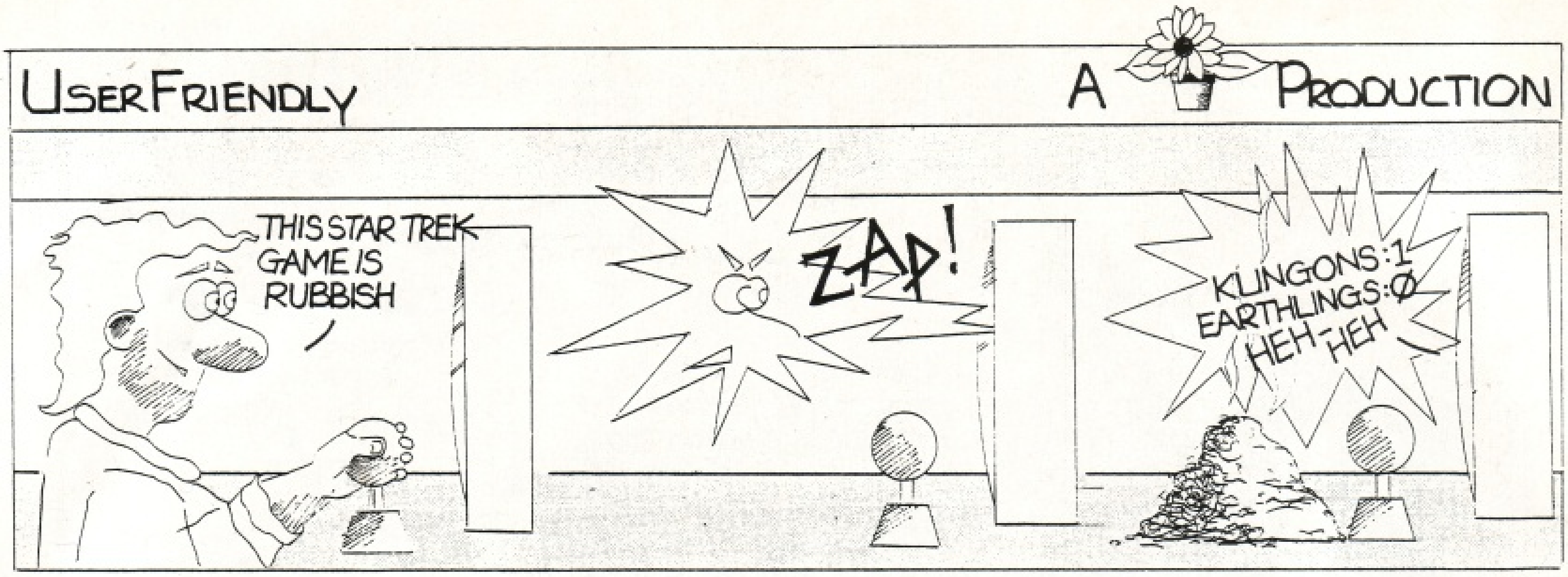
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